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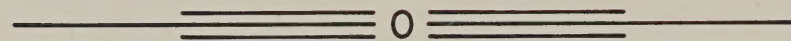
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Atlas of county drainage
maps, Indiana

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ATLAS
OF
COUNTY DRAINAGE MAPS
INDIANA



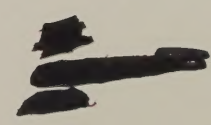
PREPARED BY

STAFF OF AIRPHOTO LABORATORY
JOINT HIGHWAY RESEARCH PROJECT
ENGINEERING EXPERIMENT STATION

PURDUE UNIVERSITY
LAFAYETTE, INDIANA
AND
STATE HIGHWAY DEPARTMENT OF INDIANA
INDIANAPOLIS, INDIANA

ENGINEERING BULLETIN
EXTENSION SERIES No. 97
JULY, 1959

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FOREWORD

This atlas of the county drainage maps of Indiana is the culmination of a program for the development of detailed surface drainage maps from aerial photographs. It is a part of the highway research program conducted by the Joint Highway Research Project which is a cooperative project between the Engineering Experiment Station at Purdue University and the State Highway Department of Indiana.

1374216

The drainage mapping program was initiated in the spring of 1946 with the objective of mapping the intermittent and perennial stream systems of the state in detail on maps of a convenient scale. The drainage maps were prepared by the staff of the Airphoto Interpretation Laboratory of the Joint Highway Research Project under the active direction of Merle Parvis, Research Engineer.

The counties are in alphabetical order and one-page of general information on each county is included. The symbols used on the maps are the same for every map and a legend of these symbols is included in the Introduction of this atlas.

Drainage maps have application for the obtaining of drainage areas for use in county, state, and federal highway, airport, and flood control projects. Drainage maps also exhibit drainage patterns which are important clues to the identification of soils and bedrock of the areas covered by the maps. They have been found useful by various public and private agencies in Indiana.

Copies of the atlas can be obtained from the Joint Highway Research Project, Purdue University, Lafayette, Indiana. Single copy maps are also available from the same agency at a scale of one inch equals two miles or at a scale of one inch equals one mile.

Acknowledgements are due all those who aided in the preparation of the maps. Special acknowledgements are accorded to the Head of the School of Civil Engineering, Purdue University, and to the members of the Advisory Board and Staff of the Joint Highway Research Project, Purdue University, and to the State Highway Department of Indiana.

PRICE \$ 15.00

INTRODUCTION

GENERAL NATURE OF STATE

Indiana is located near the center of the eastern half of the United States mainland. Its area is approximately 36,350 square miles (3).^{*} Its capital is Indianapolis.

The climate of the state is continental. Its warm, humid summers and moderately cold winters have wide ranges in temperatures. The average annual rainfall for the state is about 40 inches (15). The range is from slightly more than 30 inches in the northern part to about 50 inches in the central-southern part. The average annual snowfall for the state is about 23 inches. This varies from more than 50 inches in the northern part to about 15 inches in the southwestern part. Only mean annual precipitation is given in the text for each county. The intensity of precipitation and storm frequency occurring within individual watersheds are extremely variable items and should be investigated separately for each project. For this reason locations of gaging stations are listed.

In respect to its physiographic situation in the United States, the glaciated portion of Indiana lies within the Central Lowland province and the unglaciated portion lies within the Interior Low Plateaus province (3). The surface of the state varies from nearly level glacial plains and lacustrine areas to a somewhat rough residual low plateau. The maximum elevation is about 1,285 feet above sea level in southeastern Randolph County and the minimum elevation is about 313 feet in southwestern Posey County (3). Maximum local relief is about 610 feet in eastern Harrison County (3). Stream dissection, also, varies within the several areas but it is as great in parts of the glaciated portion as in parts of the plateau. Residual areas are in places severely dissected. Some morainic areas are extremely rolling. Till plain or intermorainic areas are usually gently undulating. Land forms vary from small glacial knolls to high outliers of resistant bedrock, and from lakebeds to escarpments.

Surface and near surface geologic ages represented in the state are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in origin; they occur on the surface in all counties, being deposited either by wind, water, or ice. They consist of sands, gravels, silts, and clays (4). Bedrock includes rocks of five geologic ages: Ordovician, Silurian, Devonian, Mississippian and the Pennsylvanian. The rock consists mainly of shales, limestones, sandstones, and coals. Bedrock is rarely exposed at the surface except in valleys and stream beds. There are several counties in the central and northern part of the state in which the bedrock is so deeply covered with glacial drift that rock does not outcrop.

Much of Indiana has been glaciated. Approximately 30,100 square miles have been glaciated (3). Materials of at least two glacial ages are exposed. Illinoian drift covers about 7,200 square miles in the southeastern and southwestern parts of the state (3). About 22,900 square miles of the north and central parts are within the bounds of Wisconsin glaciation (3). Glacial materials were deposited chiefly in the form of till plains and moraines. Kames, eskers, outwash plains, river terraces, lakebeds and filled subsurface valleys are some of the other features resulting from glaciation. The unglaciated area is about 6,250 square miles.

The soils of the state are derived from alluvial, aeolian and glacial materials and from residual bedrock fragments. The soils usually reflect the characteristics of their parent materials. The uplands in the central-southern part are covered with soils developed from residual materials. The remainder has soils developed from glacial materials. Transported materials in many places have been superimposed on both the residual and glacial materials and have become the parent materials for soil development. Surface soils are generally silty in texture and are usually more or less permeable. Subsoils vary from permeable to very impermeable depending upon their texture and structure, and upon the topographic situation of specific locations (6).

^{*} Numbers in parentheses refer to Bibliography.

Granular materials (glacial gravels and sands) occur in large amounts in many of the glaciated counties. They are seldom found in Illinoian drift areas. They are not obtainable in residual bedrock areas unless they have been deposited by streams originating in glaciated areas and flowing through the unglaciated areas. Granular materials exist in knolls, ridges, outwash plains and stream valleys; subsurface deposits are found, also. Sands are plentiful in some counties, scarce in others. Relatively large areas of sands are found in the northwest and southwest portions of the state.

Much of the southwest portion is blanketed by loess. Glacial lakebeds occur in the Calumet and Maumee drainage basins and adjacent to the outer limits of Illinoian and Wisconsin glaciation.

DRAINAGE FEATURES

Nearly nine-tenths of the area of the state (extending northward from the Ohio River) lies within the Mississippi drainage basin (3). The remaining one-tenth (the northeastern part and much of the northern part) is in the St. Lawrence drainage basin. In general, stream gradients are low in the smaller portion due to base levels afforded by the Great Lakes. Stream gradients in the greater area are somewhat higher, mainly due to their uninterrupted descent to the sea; an exception is the Kankakee River, blocked by a bedrock barrier in Illinois.

The directional trend of the stream courses of the southern and central parts of the state are influenced, at least partially, by the dip of the underlying bedrock. There appears to be some influence, also, of the bedrock (although it is deeply covered by glacial drift) on stream direction in the northern and northeastern parts. Surface features (land forms), however, exert local, as well as regional, control on the streams.

The Wabash River and its tributaries drain about two-thirds of Indiana. Its drainage area in the state is about 24,200 square miles (12). Of this the White River system drains about 11,290 square miles; the Patoka River approximately 860 square miles; and smaller streams below the Patoka River, more than 550 square miles (12). In its upper reaches the Wabash receives water from about 295 square miles in the state of Ohio (3). Also, where it joins the Ohio River the Wabash is carrying water from various Illinois-Ohio watershed totalling approximately an additional 8,600 square miles. Thus the entire drainage area of the Wabash embraces more than 33,100 square miles (11).

Streams entering the Ohio River directly along the southern boundary of the state drain more than 4,000 square miles (12). Of this area Blue River drains about 475 square miles.

The Whitewater River drains about 1,300 square miles of the state. In addition, it carries water from small areas in western Ohio. It flows into the Miami River in southwestern Ohio (3).

The Maumee drainage basin in the state is more than 1,200 square miles (12). Water from about 1,100 square miles of Ohio and Michigan also flows through the Maumee River (3).

The St. Joseph River, as it leaves the state north of South Bend, carries water from about 1,665 square miles of northern Indiana, plus the water from over 1,900 square miles in Michigan (3)(12).

There are approximately 650 square miles in the Calumet drainage basin. The Calumet River itself is connected to both Lake Michigan and the Illinois Waterway; its direction of flow depends largely on flood conditions. Several small watersheds drain directly into Lake Michigan. A small area in the state of Michigan drains into the lake via Trail Creek (3).

The Kankakee River drainage basin is slightly more than 3,100 square miles (12). It includes the Iroquois River basin and that of Sugar Creek in Benton County. Nearly all the area drained by both rivers is lacustrine.

The foregoing figures do not include watershed areas which drain from

INTRODUCTION (CONT.)

the state by way of small streams into neighboring states. There are listed, however, some of the components of the more than 5,000 square miles which drain into the state (12). The Miami River, which makes a very short loop through the southeast corner of Dearborn County is not included as one of the state's streams.

There are a great many lakes of glacial origin in northern Indiana, some of which are several square miles in extent. River valleys contain occasional bayous. Artificial lakes have been constructed in various parts of the state. Ponds of different origins occur in every county. Lakes tend to stabilize the flow of streams. Swamps have been reduced by artificial drainage. The area of Lake Michigan within the boundary of the state is about 230 square miles (3).

Ditches have been constructed throughout the state to improve drainage where it is impeded. Streams like the Kankakee River have been straightened to increase their gradients.

Runoff in streams is normally obtained from gaging stations (12).

THE DRAINAGE MAPS

The surface drainage maps of the state were compiled from United States Department of Agriculture aerial photographs (scale, 1:20,000) taken during the period 1937-1951. Base maps used were traced from blue-line prints of the Indiana 1937 "Highway and Transportation Maps" (scale, 1:63,360).

The aim in the preparation of this atlas is to present the surface drainage maps of all the counties in one volume. The object is to make available to those interested in the stream systems of the state from an engineering standpoint a complete set of surface drainage maps at a convenient scale.

These surface drainage maps are planimetric maps and are graphical expressions of the horizontal projections of the drainageways of the state. The maps show stream courses (which are continuous from river to gully), lakes, and closed basins (in which water collects and is removed by seepage, by evaporation, or by artificial means). The maps show stream courses in their relative positions within the land sections thereby portraying the form and shape of each system. They show the size of rivers and the size and shore lines of lakes at the time of photography. This is, also, the case in indicating infiltration basins. Watershed divides can be closely approximated. The watershed of each stream system can be delineated and measured.

The drainage patterns and their densities can be observed. The density of a pattern can indicate degree of dissection; therefore, it can be a clue to internal drainage and the porosity of the material through which a stream flows. An efficient drainage system (one having many branches) contributes to rapid stream flow; sluggish streams have smooth, closely-spaced meanders.

The data on the drainage maps are generalized in order to present the extent of the systems. Because of this generalization the true widths of almost all streams, especially the smaller ones, are greatly exaggerated. However, the widths of large rivers can be measured with a reasonable degree of accuracy.

The graduation of the stream lines usually indicates direction of flow. In doubtful situations direction of flow is marked by arrows.

The elevations shown give some indication of topographic relief in the several counties. Thus, in many situations, the lengths of many streams and their valley slopes can be determined very nearly accurately since the maps show only their horizontal projections.

The geography of areas can be partially described by the cultural symbols on the maps (cities, highways, etc.). Such topographic features as ridges and valleys can be located and described as to width and length.

Boundary lines are shown except where streams take preference and along the Ohio River. The right (north) bank of the river is the boundary between Indiana and Kentucky unless otherwise noted.

Map symbols are as shown on the legend on this page. The names of cities, towns, lakes, streams, etc., are added to facilitate the use of the maps. Land grants are so indicated. The area of Lake Michigan is not shaded because of its great extent. Bridges are ordinarily not shown. No differentiation is made between dredged ditches and natural streams.

LEGEND	
	CITIES AND INCORPORATED TOWNS
	UNINCORPORATED CITY ADDITIONS
	STATE CAPITAL
	COUNTY SEATS
	OTHER TOWNS AND VILLAGES
	U.S. AND STATE HIGHWAYS
	STATE LINE
	COUNTY LINE
	CONGRESSIONAL TOWNSHIP CORNERS
	SECTION LINES
	APPROXIMATE ELEVATIONS
	MAJOR STREAMS
	PERENNIAL STREAMS
	INTERMITTENT DRAINAGE WAYS
	CANALS
	BRIDGES
	LAKES AND PONDS
	INFILTRATION BASINS
	SINK HOLES
	ELEVATED AREAS
	DAMS
	HEADWALLS

ADAMS COUNTY

GENERAL NATURE OF THE COUNTY

Adams County is located in the northeastern part of Indiana. Its area is approximately 345 square miles (1). Decatur, the county seat, is 100 miles northeast of Indianapolis.

The mean annual precipitation is 36.20 inches at Berne (2). An average yearly snowfall from 25 to 30 inches can be expected.

Adams County lies wholly within the Tipton Till Plain physiographic region of the state (3). In respect to its physiographic situation in the United States it lies within the Till Plains section of the Central Lowland province (3).

The surface of the county is that of a glacial plain broken by the valleys of the St. Marys and Wabash rivers and their tributaries. It is ridged by the Ft. Wayne and Wabash moraines. Maximum local relief is about 60 feet (3). The central part of the county is slightly undulating. The Wabash moraine, on the northeast side of the Wabash River, is uneven, displaying swags and swells. The Ft. Wayne moraine, on the northeast side of St. Marys River, is undulating in character. The most uneven surface is in the southwestern part. Depressed areas occur in the vicinity of Geneva, east of Berne, near Magley, and along Blue Creek.

The surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). The Quaternary materials are both Pleistocene and recent in age. The bedrock is of Silurian age (4). Limestone is exposed at several places along the St. Marys and Wabash rivers and along Blue Creek. Quarries have been operated at sites mostly in the southern half of the county (30).

All Adams County was glaciated (8). Surface drift is Wisconsin in age. The thickness of the drift varies from a few feet to nearly 400 feet (13). The stream systems have been formed in these materials; seemingly preglacial topography has had little effect on the direction in which these streams flow. Glacial drift is deepest in the buried valley of the preglacial Teays River (13).

The soils of the county have been derived from Wisconsin glacial materials (5) (33). Intermorainic areas contain Nappanee and Brookston soils. Morainic areas have St. Clair and Brookston soils. Some Fox soils are found in the county. Along the major streams are alluvial soils belonging to the Genesee catena. Many of the areas marked as depressions on the map contain soils high in organic content (e.g., Clyde soils); some have muck and/or peat. Subsoils are mostly slowly permeable (6).

Granular materials have been found along the streams and in knolls. Principal areas producing sand and gravel are to be found in the central-southern and central-northern parts of the county (7). Preglacial valleys contain granular materials (8).

DRAINAGE FEATURES

The southwest quarter of the county lies within the Wabash drainage basin of the state. The remainder of the county is included in the Maumee drainage basin (3).

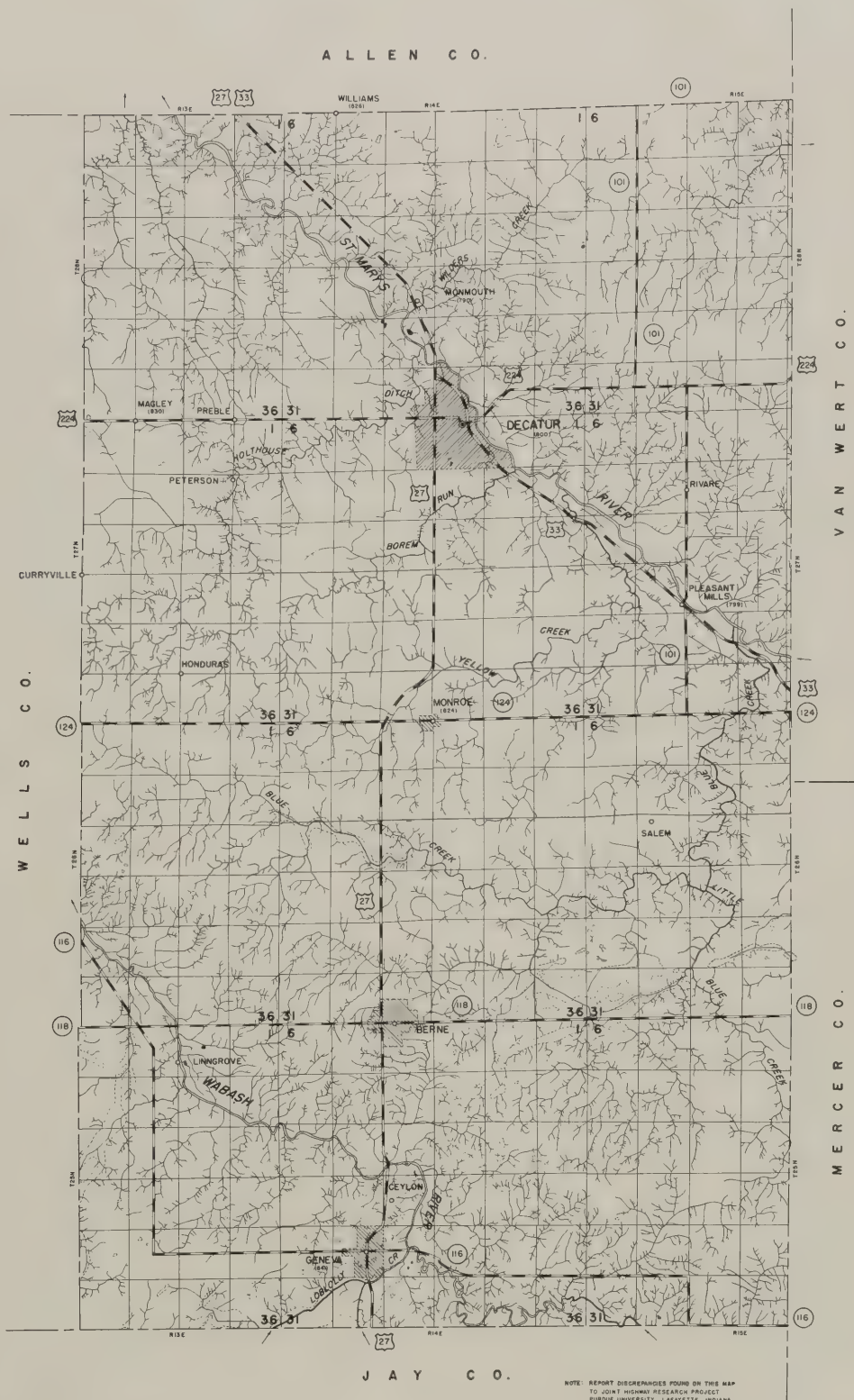
The course of the St. Marys River is more or less controlled by the Ft. Wayne moraine. Likewise, the Wabash River owes its location to the Wabash moraine. It is only where the stream systems have cut through the drift to the bedrock that they are affected by the rock. The Wabash Valley is a rather shallow one in the county. The crests of sections of moraines define watershed divides in the county. Some control of stream courses, and some stream deflections can be attributed, at least partially, to the presence of the moraines. Increased densities of drainage patterns occur in morainic areas. A singular feature of the drainage of Adams County is the easterly direction in which Blue Creek flows in its upper reaches. Loblolly Creek flows in the basin-outlined surface expression of the buried Teays valley (13). The St. Marys River drains about 450 square miles of western Ohio before entering Indiana (3). The northeastern corner drains into Ohio. Little Blue Creek rises in Ohio; its drainage area in that state is small.

There are no natural lakes in the county. However, ponds of various origins are scattered over the area.

In many of the nearly level sections of the county the natural stream courses have been artificially straightened, widened, and deepened; ditches have been constructed to improve sluggish drainage conditions.

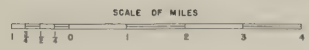
A stream gaging station is located on the St. Marys River at Decatur (12). The drainage area of the St. Marys River above Decatur is about 615 square miles (12).

Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1954.



**DRAINAGE MAP
ADAMS COUNTY
INDIANA**

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1954



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

ALLEN COUNTY

GENERAL NATURE OF THE COUNTY

Allen County is located in the northeastern part of the state. Its area is approximately 671 square miles (1). Ft. Wayne, the county seat, is 115 miles northeast of Indianapolis.

Mean annual precipitation is 36.22 inches at Ft. Wayne (2). An average annual snowfall of at least 30 inches can be expected.

The southern third of the county lies within the Tipton Till Plain physiographic region of the state. The east-central third comprises the entire Maumee lacustrine section of the Northern moraine and Lake region, and the northern third is included in the Steuben Morainial Lake section of the same region (3). In respect to its physiographic situation in the United States, the southern third is in the Till Plains section of the Central Lowland province, and the remainder is in the Eastern Lake Section of the same province (3).

The surface of the county is that of a glacial plain broken by its principal streams. It is ridged by moraines and modified by wind and water action. A high ridge exists in the central-northern part. Maximum local relief is about 100 feet (3). Dissection is greatest near the main streams. Morainic areas are rolling and hummocky, some have subdued swag and swell topography. Intermorainic areas are gently undulating. One prominent ridge occurs on the nearly level lakebed near its central part. A nearly level tract lies between Cedar Creek and Eel River. A glacial channel extends from Cedar Creek to Eel River.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. The bedrock strata underlying the southern and central portions are the formations of the Silurian age. In the northern part it is of Devonian age. There are no known outcrops of rock in the county.

All Allen county was glaciated (3). Surface drift is Wisconsin in age. The drift thickness varies to 300 feet (4). This is in accordance with the preglacial topography. The county is traversed by portions of three morainic systems (8). The Salamonie moraine covers a few square miles of the northwestern corner of the county. The Wabash moraine extends from the southwest corner to the central part of the northern boundary. The Ft. Wayne moraine curves from the south-central, to the central, to the northeastern part; it presents a steeper slope on the north side of the Maumee River than on the south. There is a ridge near Monroeville that appears to be morainic (8). Other ridges in the vicinity have a somewhat similar character.

The mineral soils have been developed from glacial materials, many of which have been reworked by wind and water (5) (32). Morainic area soils belong to the St. Clair catena. Maumee soils are sands as are lacustrine soils belonging to the Lucas catena; they are calcareous clays and silts. Abington, Homer, Westland and Fox soils are found on the beach ridges and other granular deposits. Alluvial soils belong to the Genesee catena. Depressions have Clyde soils. Mucks and peat occur in many sections of the county. Most subsoils have slow to very slow permeability except the river valley subsoils in the western part, which are very permeable (6).

Granular materials occur in terraces along some of the major streams; in the beach ridges; and in knolls scattered throughout the morainic areas (7). Granular terraces exist along the St. Joseph River. There is a plain of granular materials in the northwest part of the county.

Sand dunes are to be found near Waynedale in the Little Wabash River valley. There are dunes on the bed of the former glacial Lake

Maumee. Many of the beach ridges bordering the lakebed are quite sandy in texture. Sandy ridges lie in the east part of Ft. Wayne. The delta at New Haven is composed mostly of sand (7). Some silt is found in the Little Wabash River valley.

Glacial Lake Maumee extends into Indiana, covering about 100 square miles (8). The lakebed area reaches to the western part of Ft. Wayne. A series of beach ridges mark the various stages of the lake when it existed. Also, part of the Little Wabash River valley is very low topographically (8).

DRAINAGE FEATURES

The eastern two-thirds of Allen County lies within the Maumee drainage basin of the state (3). The western third of the county is included in the Wabash drainage basin; the northwestern corner is in the Eel subdivision, and the west and southwest parts of the area are in the Little Wabash subdivision.

Drainage through the Maumee, St. Marys and St. Joseph rivers is easterly to Lake Erie. In the western part the trend of drainage is westerly to the Wabash River. Streams are widely spaced in the inter-morainic areas. Drainage is best developed near the principal streams. The Little Wabash river valley acted as a glacial sluiceway. Natural drainage in the lakebed areas is poorly developed; it is supplemented artificially. The St. Marys River, a northwesterly flowing stream, unites with the St. Joseph River, a southwesterly flowing stream, at Ft. Wayne to form the Maumee River, an easterly flowing stream. The Maumee River has neither flood plain nor terrace. It is a sluggish stream with a very low gradient. Local basins occur in the morainic areas. An old channel extends southward from New Haven. Fine-textured drainage patterns, though haphazard in places, outline the moraines of the county. Crests of sections of moraines define watershed divides in the county. Control of stream courses and stream deflections can be attributed, in part, to the presence of the moraines. Streams are in shallow trenches in the Ft. Wayne moraine. Major streams cross morainic areas. Cedar Creek crosses the Wabash moraine in a deep valley. The courses of the Wabash River, St. Joseph River, St. Marys River, Cedar Creek, and Aboite Creek are controlled, at least partially, by the various moraines.

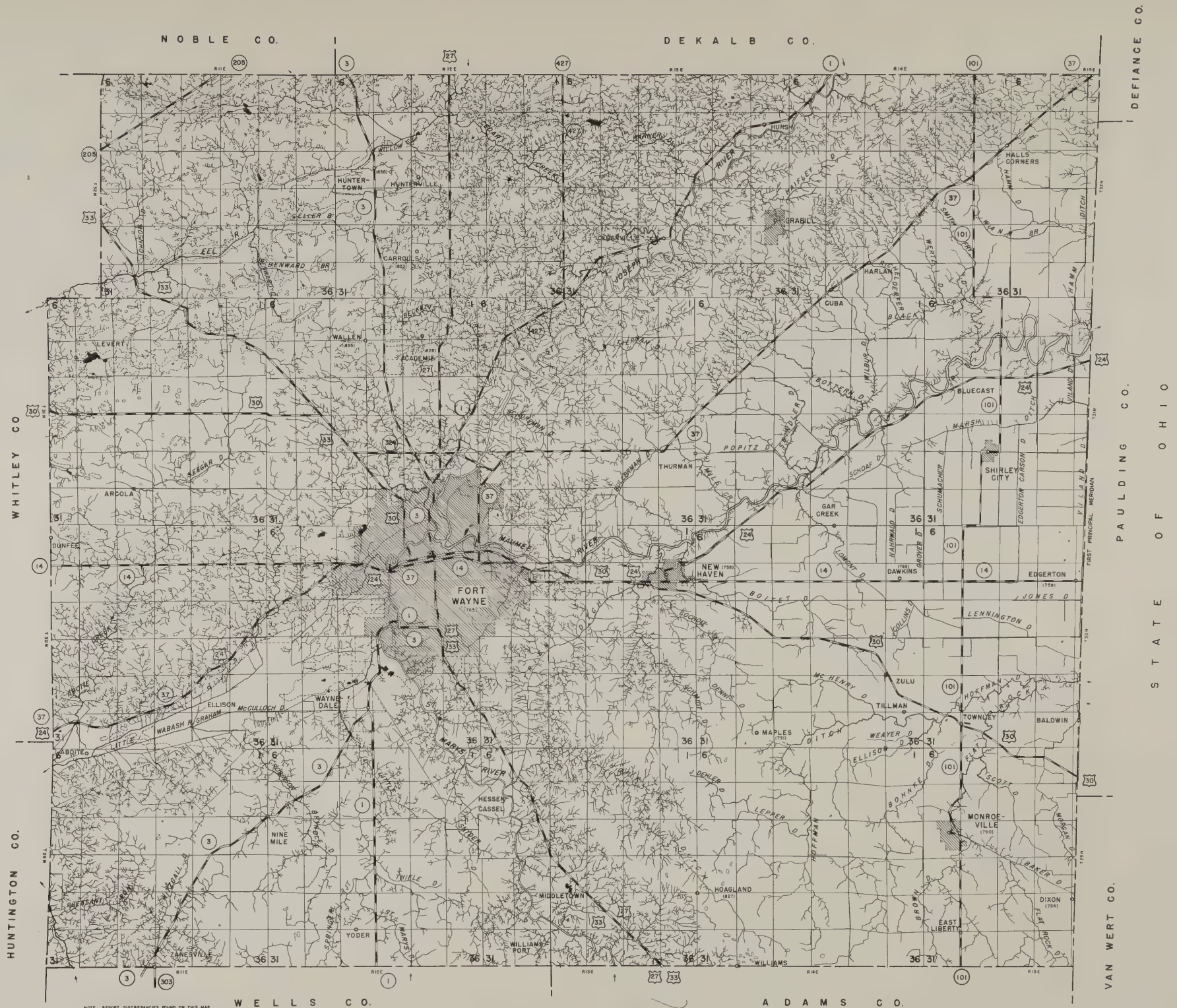
There are a few lakes in the northwestern part of the county. White Lake and Lake Everett are the largest ones. Artificial lakes and ponds of various origins are scattered throughout the area. A gaging station is located on Lake Everett (12).

Ditches have been constructed to improve drainage conditions. Morainic basins as well as the lakebed area have been drained by dredged ditches.

Stream gaging stations are located on the Maumee River at Ft. Wayne and New Haven; on the St. Joseph River at Hursh, Leo, and Ft. Wayne; on St. Marys River near Ft. Wayne; and on Cedar Creek near Cedarville (12).

The Maumee drainage basin contains about 1,200 square miles in Indiana (11). This does not include the watersheds of Flat Rock and Mary Del Arme creeks, for these streams enter Ohio before joining the Maumee. In addition about 1,100 square miles of Ohio and Michigan are drained by the Maumee River (3).

Note: The drainage map was prepared from 1938 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1949.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO: JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP
ALLEN COUNTY
INDIANA

PREPARED FROM
1938 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1950



POLYCONIC PROJECTION

ALLEN COUNTY

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DRAINAGE FEATURES

The eastern two-thirds of Allen County lies within the Maumee drainage basin of the state (3). The western third of the county is included in the Wabash drainage basin; the northwestern corner is in the Eel subdivision, and the west and southwest parts of the area are in the Little Wabash subdivision.

Drainage through the Maumee, St. Marys and St. Joseph rivers is easterly to Lake Erie. In the western part the trend of drainage is westerly to the Wabash River. Streams are widely spaced in the inter-morainic areas. Drainage is best developed near the principal streams. The Little Wabash river valley acted as a glacial sluiceway. Natural drainage in the lakebed areas is poorly developed; it is supplemented artificially. The St. Marys River, a northwesterly flowing stream, unites with the St. Joseph River, a southwesterly flowing stream, at Ft. Wayne to form the Maumee River, an easterly flowing stream. The Maumee River has neither flood plain nor terrace. It is a sluggish stream with a very low gradient. Local basins occur in the morainic areas. An old channel extends southward from New Haven. Fine-textured drainage patterns, though haphazard in places, outline the moraines of the county. Crests of sections of moraines define watershed divides in the county. Control of stream courses and stream deflections can be attributed, in part, to the presence of the moraines. Streams are in shallow trenches in the Ft. Wayne moraine. Major streams cross morainic areas. Cedar Creek crosses the Wabash moraine in a deep valley. The courses of the Wabash River, St. Joseph River, St. Marys River, Cedar Creek, and Aboite Creek are controlled, at least partially, by the various moraines.

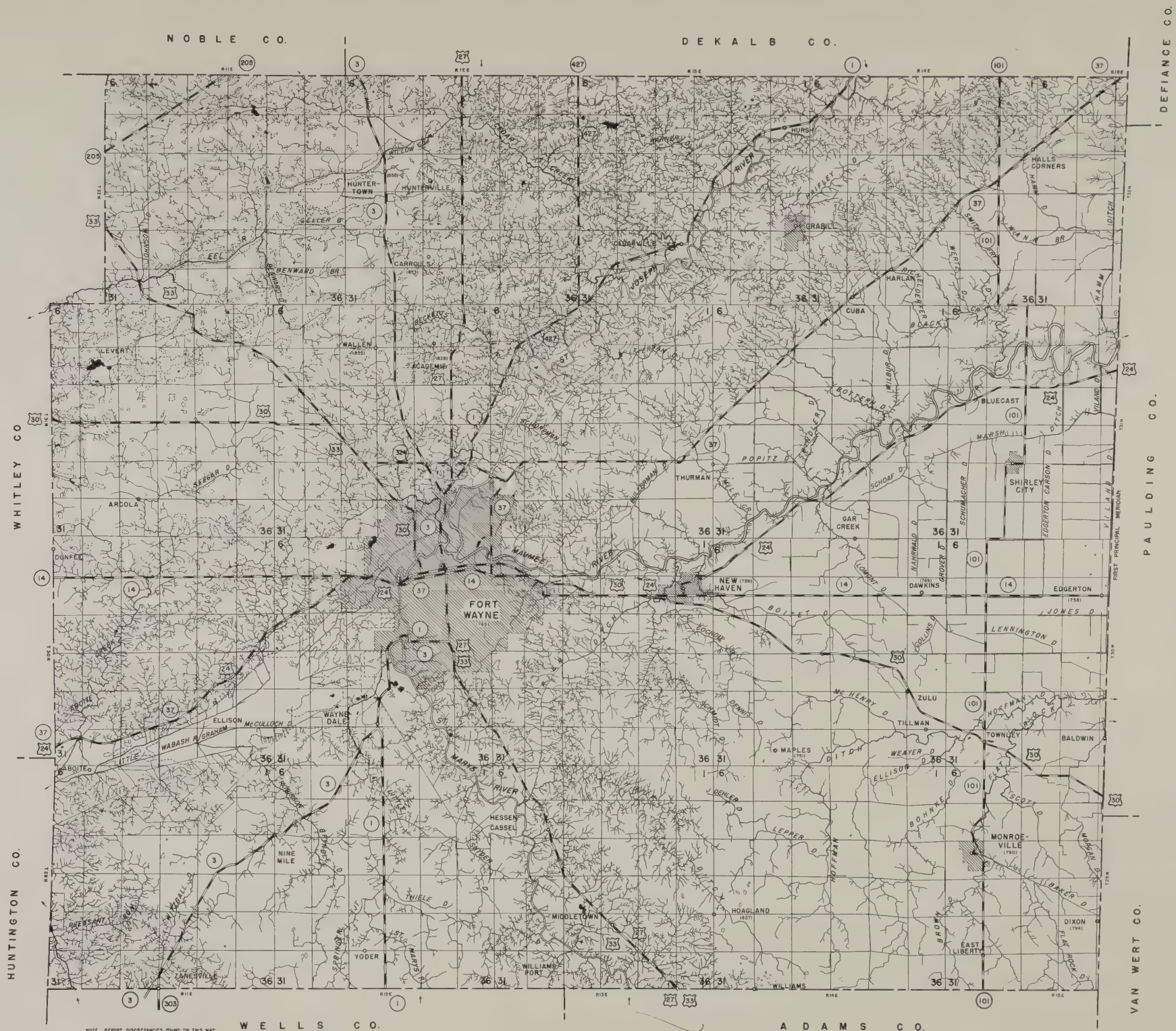
There are a few lakes in the northwestern part of the county. White Lake and Lake Everett are the largest ones. Artificial lakes and ponds of various origins are scattered throughout the area. A gaging station is located on Lake Everett (12).

Ditches have been constructed to improve drainage conditions. Morainic basins as well as the lakebed area have been drained by dredged ditches.

Stream gaging stations are located on the Maumee River at Ft. Wayne and New Haven; on the St. Joseph River at Hursh, Leo, and Ft. Wayne; on St. Marys River near Ft. Wayne; and on Cedar Creek near Cedarville (12).

The Maumee drainage basin contains about 1,200 square miles in Indiana (11). This does not include the watersheds of Flat Rock and Mary Del Arme creeks, for these streams enter Ohio before joining the Maumee. In addition about 1,100 square miles of Ohio and Michigan are drained by the Maumee River (3).

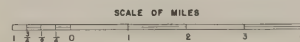
Note: The drainage map was prepared from 1938 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1949.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP ALLEN COUNTY INDIANA

PREPARED FROM
1938 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1950



POLYCONIC PROJECTION

BARTHOLOMEW COUNTY

GENERAL NATURE OF THE COUNTY

Bartholomew County is in the south-central part of the state. Its area is approximately 402 square miles (1). Columbus, the county seat, is 40 miles south-southeast of Indianapolis.

Mean annual precipitation is 39.54 inches at Columbus (2). Average annual snowfall is not expected to exceed 20 inches.

The eastern third of the county lies within the limits of the Muscatatuck Regional Slope physiographic region of the state (3). The central part, which includes the valleys of East Fork White River, Driftwood River, and Flat Rock River, is within the Scottsburg Lowland. The southwestern corner is a part of the Norman Upland. In respect to its physiographic situation in the United States, the county is in the Till Plains section of the Central Lowland Province (3).

The topography of the county varies from hilly in the western part, to nearly level in the central part, to rolling in the eastern part. Maximum local relief is about 300 feet (3). In the western portion the surface is rough and broken; there are many high hills, and the Knobstone escarpment is a prominent feature. The central section is composed of nearly level tracts of land bordering the principal streams; these are the valley trains of the glacial sluiceways. In the eastern section, stream dissection has produced a rolling landscape. The presence of morainic masses has added to this undulating effect. There is an undulating area east of Hope. Sinkholes are found locally in a few areas in the eastern part of the county. They have caused a pitted unevenness in the terrain along some of the streams.

The surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock in the eastern part of the county consists of strata of Silurian and Devonian age. In the western part it is of Devonian and Mississippian age. The formations consist of limestones and shales in the eastern part and shales, limestones, and sandstones in the western part (4). Rock is exposed in various parts of the county; e.g., shale outcrops five miles south of Columbus (3).

Evidences are that the entire county was glaciated, with the exception perhaps of the tops of some of the highest hills in the western part. Much of the drift has been eroded from the surface in the western part. Drift in the southwestern part is Illinoian in age; and, in the central and northeastern parts, it is Wisconsin in age (3) (28). The Shelbyville and Champaign morainic systems traverse the county. The Shelbyville moraine follows the Wisconsin drift border intermittently from the northwest corner to the southeast corner; it is rather prominent north of Elizabeth. A portion of the Champaign moraine extends from near Columbus to the northeast corner of the county and a small section of this system is to be found near Edinburg (3).

Soils have been developed from glacial materials, except in the western part where they have formed from sandstone-shale (6) (33). Illinoian drift soils in the uplands belong to the Cincinnati catena. Soils of the Wisconsin drift upland belong to the Miami and Russell catenas. Soils of the Zanesville catena occur in the western part. Fox and Westland soils are found on the granular deposits. Clyde and Cope soils are upland depression soils. Sandy soils are of the Princeton catena. Bottom land soils are of the Genesee and Pope catenas. Very little muck occurs (33). In the western part subsoils are slowly to very slowly permeable (6). In the eastern part they are moderately to slowly permeable. Sandy area subsoils

are mostly permeable. River valley subsoils are very permeable.

The valleys of Driftwood River, East Fork White River, Flat Rock River, Haw Creek, and Clifty Creek appear to have been glacial sluiceways. They contain much granular material (7). Internal drainage of the soil is excellent, and surface drainage is weakly developed. Gravel is also found along several other streams and in knolls and ridges.

There are scattered sand dune areas in the uplands east of East Fork River (10). Thin deposits of sand occur along the valley of Little Sand Creek. Some dunes are found west of Columbus.

Lakebed areas have been mapped west of Driftwood River (33).

DRAINAGE FEATURES

The entire county is included in the East Fork subdivision of the White River drainage basin of the state (3).

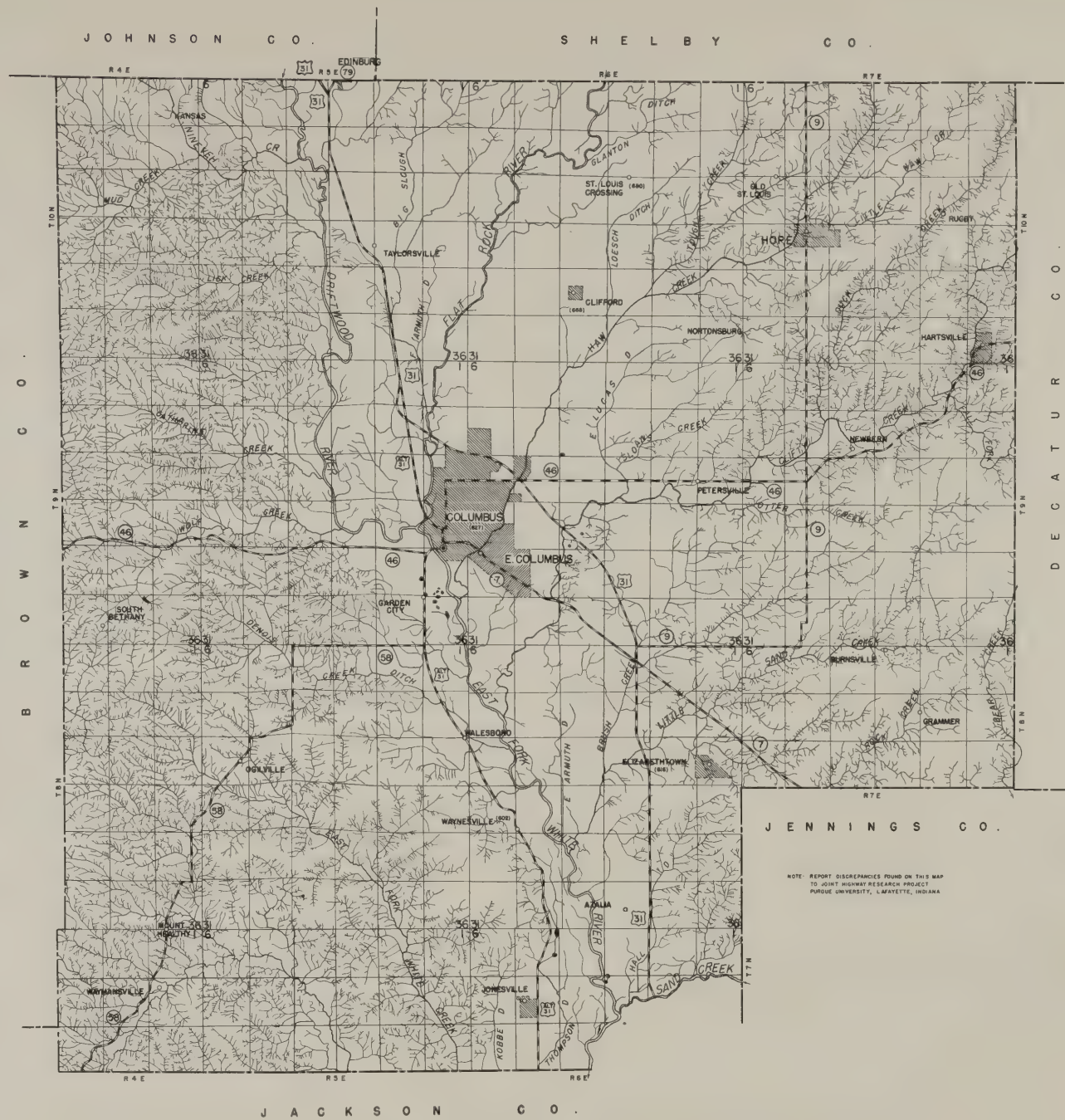
A drainage divide which defines the crest of the Knobstone escarpment exists in the west-central part of the county. The streams which flow westward from this divide into Brown County are the tip-end tributaries of the Salt Creek stream system. Streams are somewhat entrenched in the eastern part. Waterfalls are found in the streams near Hartsville. Natural drainage is well developed. Sand Creek is alluviated. Integrated drainage exists in the western part of the county. The valleys of East Fork White River, Driftwood River, Flat Rock River, and Haw Creek are, for the most part, broad and gently sloping to the south. Driftwood River and East Fork White River flow in the trough of the Scottsburg Lowland. The course of Driftwood River appears to have been influenced by glaciation. Stream development in the western part is thorough. There is a lack of minor stream development in the central part because of the porous nature of the underlying materials and the nearly flat surface. This area is a valley train of granular materials. The westerly trend of the streams in the eastern part is influenced, at least partially, by the dip of the underlying bedrock and by the regional slope. The density of the drainage patterns in the eastern part is slightly intensified by the presence of moraines. Streams in the southeastern part cross a morainic area. Some control of streams and some stream deflection can be attributed to the moraines. The sharp deflection in Fall Fork Clifty Creek is probably due to rock control.

While there are no natural lakes, water-filled gravel pits and ponds of various origins exist in many parts of the county. Artificial lakes have been constructed.

Ditches have been dredged in the nearly flat areas.

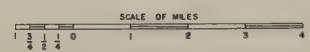
Stream gaging stations are located on East Fork White River at Columbus, and on Clifty Creek at Hartsville (12). The drainage area of East Fork White River above Columbus is about 1,710 square miles (11). The drainage area of Clifty Creek above Hartsville is about 98 square miles (12).

Note: The drainage map was prepared from 1937 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1947.



DRAINAGE MAP
 BARTHOLOMEW COUNTY
 INDIANA

PREPARED FROM
 1937 AAA AERIAL PHOTOGRAPHS
 BY
 STATE HIGHWAY COMMISSION OF INDIANA
 AT
 PURDUE UNIVERSITY
 1947



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
 TO JOINT HIGHWAY RESEARCH PROJECT
 PURDUE UNIVERSITY, LAFAYETTE, INDIANA

BENTON COUNTY

GENERAL NATURE OF THE COUNTY

Benton County is located in the northwestern part of the state. Its area is approximately 409 square miles (1). Fowler, the county seat, is 85 miles northwest of Indianapolis.

Mean annual precipitation is 34.50 inches at Fowler (2). An average annual snowfall of about 25 inches can be expected.

Benton County lies wholly within the Tipton Till Plain physiographic region of the state (3). In respect to its physiographic situation in the United States it is in the Till Plains section of the Central Lowland Province (3).

The surface of the county is that of a glacial plain broken by the valleys of the Pine and Sugar creeks and their tributaries. It has gently undulating till plains and rolling morainic ridges extending generally in an east-west direction. Maximum local relief is about 70 feet (3). Morainal topography consists of groups of small knolls. Intermorainic areas are gently rolling, with a few shallow basins. Local depressions are shallow basins. A gently undulating tract lies in the eastern part.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock consists of strata belonging to the Devonian, Mississippian, and Pennsylvanian ages. Limestones and shales are exposed in the beds of Big Pine and Sugar creeks. Limestone has been quarried at these locations.

All Benton County was glaciated. Surface drift is Wisconsin in age. The thickness of the drift is more than 400 feet in the southwestern part (13). It varies according to the preglacial topography, but seems to be deepest in the preglacial subsurface Teays valley. Sections of two morainic systems are identified in the county; they exist in three more or less distinct ridges (3). The northern one is known as Nebo-Gilboa ridge; it has two prominent knolls, Mount Nebo and Mount Gilboa, and has a rather definite crest along its entire length. This moraine is probably an eastward extension of the Chetworth-Cropsey moraine in Illinois (10). The two ridges that cross the central and southern parts belong to the Bloomington moraine; they are more or less jumbled clusters of small knolls. This moraine contains the high points in the county; it is prominent in the northwestern part of the county.

The soils of the county have been developed from glacial materials (5). Till plain soils are of the Parr catena. Morainic soils belong to the Miami catena. Bottom land soils are of the Genesee catena. Depressed areas contain soils of high organic content (e.g., Clyde soils). Some are muck and/or peat. Subsoils vary from moderately to slowly permeable depending upon the topography (6).

Granular materials (fine gravels) have been found in a number of the morainic knolls (7). Stream deposits of gravel are small. There seems to be a lack of extensive sand deposits although sand has been found in some of the morainic knolls in the north-central part (9).

DRAINAGE FEATURES

The northwestern half of Benton County lies within the Kankakee drainage basin of the state (3). A small area in the northeast corner is in the Tippecanoe subdivision of the Wabash drainage basin and the remainder of the county is in the Wabash drainage basin proper.

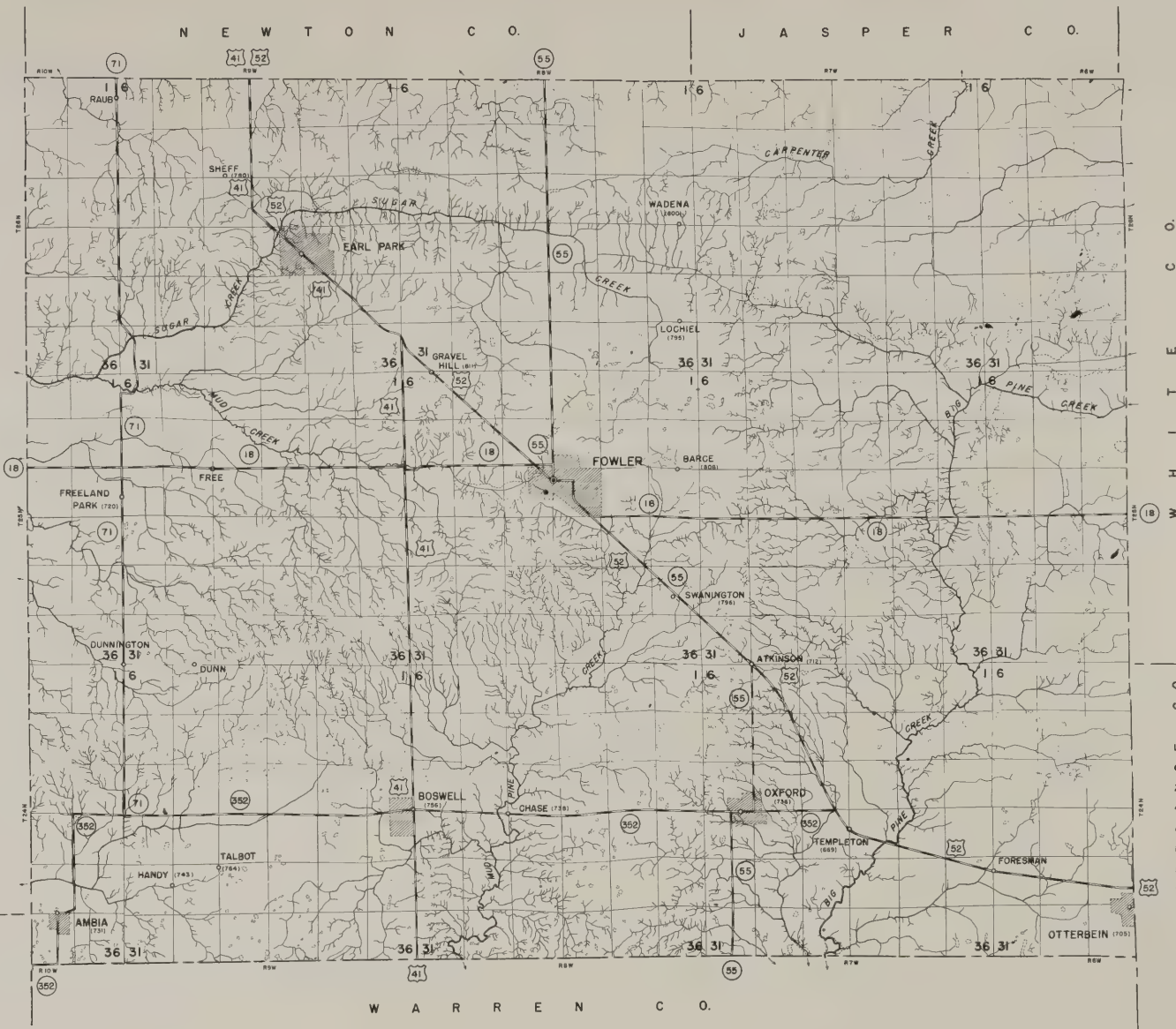
A considerable area in the western half of the county drains into Illinois; the waters eventually reach the Wabash River. Surface drainage is best developed along the major streams. The density of the drainage patterns in the central part is intensified by the presence of a moraine. With the exception of Big Pine Creek all streams have their sources in the county. Most stream valleys are shallow. Some of the local watersheds are broad and nearly level. The Nebo-Gilboa ridge forms the watershed divide between the Wabash and Kankakee drainage basins (9). The crests of the sections of moraine define watershed divides in the county. Some control of stream courses and some stream deflection can be attributed, at least partially, to the moraines. The Pine Creek stream system crosses morainic areas. In its upper reaches, Big Pine Creek flows westward before turning in a southerly direction; its northernmost tributaries flow east. Likewise, Carpenter Creek, in its upper reaches, flows eastward before turning in a northerly direction. One tributary of Mud Pine Creek flows in a northerly direction before being deflected into the main stream. The watershed divide between the Iroquois and Vermillion rivers is gently undulating.

There are no natural lakes in Benton County. A few ponds have been mapped. Some of them appear to be in depressions formed by glaciation.

The construction of surface ditches throughout many sections of the county has improved sluggish drainage conditions. Streams have been dredged; Big Pine Creek is an example.

Note: The drainage map was prepared from 1938 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1955.

STATE OF ILLINOIS
IRROQUOIS CO.
VERMILION CO.



WHITE CO.
TIPPECANOE CO.

NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP BENTON COUNTY INDIANA

PREPARED FROM
1938 AAA AERIAL PHOTOGRAPHS

BY
JOINT HIGHWAY RESEARCH PROJECT

AT
PURDUE UNIVERSITY

1954



BLACKFORD COUNTY

GENERAL NATURE OF THE COUNTY

Blackford County is located in the northeast part of the state. Its area is approximately 167 square miles (1). Hartford City, the county seat, is 65 miles northeast of Indianapolis.

From data obtained in adjacent counties the mean annual precipitation should be about 37 inches (2). An average annual snowfall of from 25 to 30 inches can be expected.

Blackford County lies wholly within the Tipton Till Plain physiographic region of the state (3). In respect to its physiographic situation in the United States it is in the Till Plain section of the Central Lowland Province (3).

The surface of the county is gently rolling except in the southwest and northeast parts where it is irregular and undulating due to the presence of moraines. It is that of a glacial plain broken by the valleys of Salamonie River and Lick Creek. Maximum local relief is about 60 feet (3). There is a nearly level tract between the Mississinewa moraine and the Salamonie River. Many of the depressions in the intermorainic areas are shallow basins. Morainal topography is of the swell-and-sag type. Depressed areas outline a glacial sluiceway that extends southwestward past Hartford city. There are many depressions in the central-eastern part of the county. In general there are no prominent knolls.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock consists of strata of Silurian age (30). Limestone has been quarried at Montpelier.

All Blackford County was glaciated. Surface drift is Wisconsin in age. Drift depth varies to more than 400 feet (13). It is deepest in the buried valley of the preglacial Teays River. A portion of the Salamonie moraine crosses the northeast corner of the county. In the southwestern part the Mississinewa moraine consists of two ridges that merge in the central-western part (3). This moraine is undulating in character.

The soils of the county have been developed from glacial drift materials, some of which have been reworked by water (5)(34). Upland soils belong to the St. Clair and Miami catenas. There are some Fox soils on the granular deposits. Bottom land soils are of the Genesee catena. Depressions contain Clyde soils. Muck and peat exist in depressed areas, also. Subsoils are slowly permeable in most areas (6). Some moderately permeable subsoils occur in the southwest corner.

Areas producing sand and gravel are located in the southwestern part (7). Granular materials have been obtained both north and southwest of Hartford City, near Montpelier, and in the southeast part of the county. Beds of sand and gravel lie at various depths (9).

DRAINAGE FEATURES

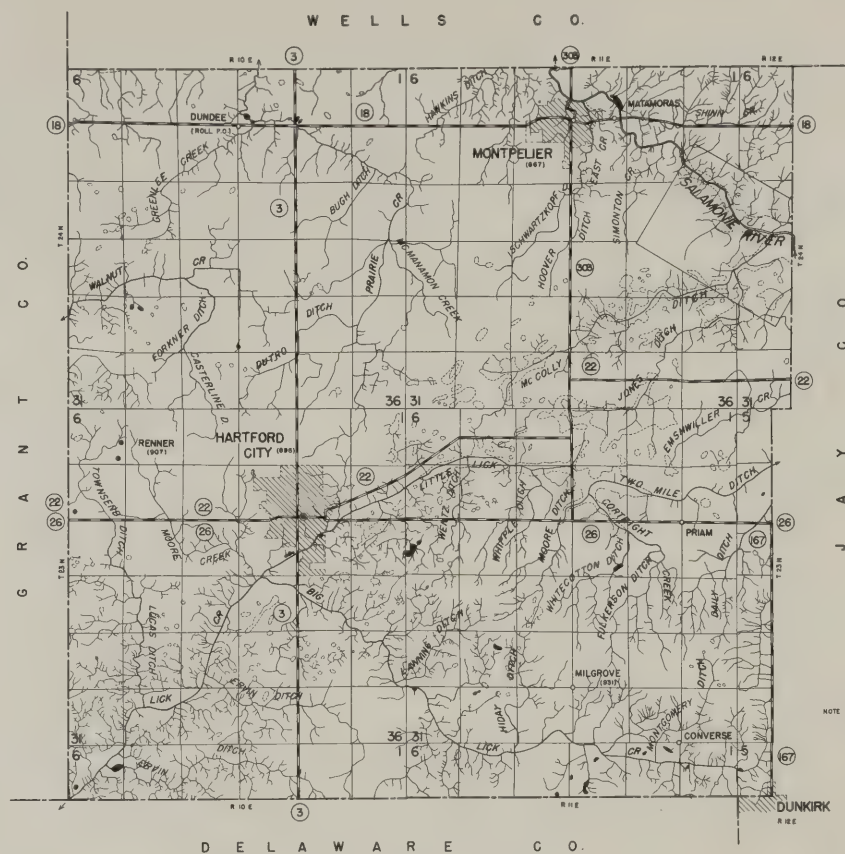
The northeastern half of Blackford County lies within the Salamonie subdivision of the Wabash drainage basin of the state (3). The remainder of the county is in the Mississinewa subdivision of the same basin.

The Lick Creek valley in its upper reaches is shallow. This includes the basin-like valley of Little Lick Creek. The northeast valley wall of the Salamonie River is incised by short streams. Surface drainage is best developed in the uplands adjacent to the stream valleys. Natural drainage is rather poorly developed in the intermorainic areas. The crests of the moraines are marked by watershed divides. Morainic areas exhibit relatively fine-textured drainage patterns as compared to the till plain areas. Some control of stream courses and some stream deflections can be attributed, at least partially, to the moraines. Lick Creek flows through a morainic area which appears to control the course of Big Lick Creek. Most small tributaries have shallow valleys. Some of the local watershed divides are broad and nearly level. Slocum Ditch has a low gradient. Noticeable is the angular course of Prairie Creek and the curving courses of Walnut and Crooked Creeks. Little Lick Creek flows in a northwesterly direction nearly parallel to the moraine before it veers westerly.

There are no natural lakes in the county. Ponds of various origins are scattered throughout the area.

Ditches have been constructed to improve poor drainage conditions. Crooked Creek has been dredged. Marshes have been drained and reclaimed for crop land.

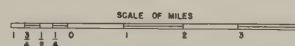
Note: The drainage map was prepared from 1951 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1948.



NOTE: REPEAT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP BLACKFORD COUNTY INDIANA

PREPARED FROM
1941 AAA AERIAL PHOTOGRAPHS
BY
STATE HIGHWAY COMMISSION OF INDIANA
AT
PURDUE UNIVERSITY
1948



BOONE COUNTY

GENERAL NATURE OF THE COUNTY

Boone County is in the north-central part of the state. Its area is approximately 427 square miles (1). Lebanon, the county seat, is about 25 miles northwest of Indianapolis.

Mean annual precipitation is 38.74 inches at Whitestown (2). An average snowfall of from 20 to 25 inches can be expected.

Boone County lies wholly within the Tipton Till Plain physiographic region of the state (3). In respect to its physiographic situation in the United States it is located in the Till Plain section of the Central Low-land province (3).

For the most part the surface of the county is a nearly level glacial plain. Occasional low knolls are to be found in the northwestern part. It is dissected by the major drainageways. It is somewhat ridged by moraines. Maximum local relief is about 80 feet (3). There are gentle swells in the till plain areas. Morainic features are rather subdued, the most prominent part of the moraine being in the southeastern corner. Here there are several knolls which add to the irregularities of the terrain. A glacial sluiceway extends southward from near Lebanon. Other channels occur in the western part. Till plains have some shallow basins. Occasional small knolls exist.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. In the eastern part of the county the bedrock is of Devonian age, and in the western part, of Mississippian age. Rock outcrops in the bed of Sugar Creek in the northwestern part of the county (29).

All Boone County was glaciated. The drift is Wisconsin in age (3)(10). The thickness of the drift varies from a few feet to more than 350 feet, much according to the buried bedrock topography (29). Sections of the Bloomington morainic system cross the county diagonally from the central-western part to the southeastern part. The moraine also crosses the northeastern corner (10). Morainic features are intermittent with till plain features near the center of the county. Ridges are rather indefinite.

The soils of the county were developed from glacial materials (5). Some materials have been reworked by water. The till plain and morainic soils have been mapped as belonging to the Miami catena. Soils of the Genesee catena are found on the bottom lands. There are some Fox and Westland soils along the major drainageways. Clyde soils are found in the depressions; some depressions contain soils of high organic content. Some muck exists. Subsoils are moderately permeable in sloping uplands to slowly permeable in depressions and nearly level areas (6). River valley subsoils are mostly permeable.

Granular materials are generally found in the bluffs, terraces, and flood plains of the larger streams, especially Sugar Creek, Prairie Creek, and Walnut Creek (7). Areas producing sands and gravel are located in the central-northern, central-southern, and southeastern parts. There are scattered granular deposits in knolls and ridges. Some are found along Sugar Creek. Gravel has been obtained at various places near Lebanon, Thorntown, and Zionsville. Subsurface gravel has been found near Royalton. Subsurface deposits of granular materials are present elsewhere, also. Sands are mostly mixed with gravel deposits.

DRAINAGE FEATURES

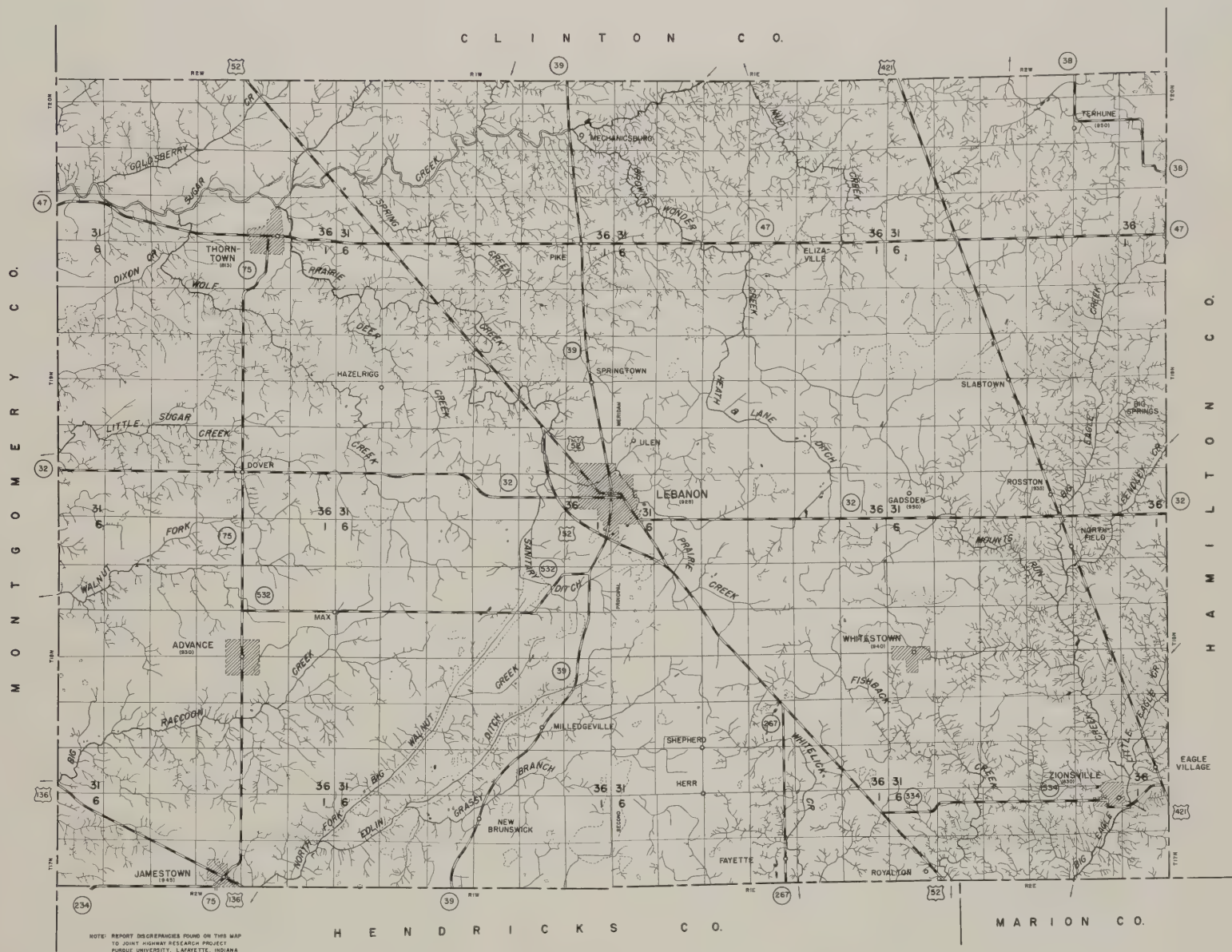
Boone County lies within two major drainage basins of the state, the Wabash and the White (3). The northwestern half of the county is in the Raccoon subdivision of the Wabash basin. The south-central part is in the Eel subdivision and the southeastern part is in the West Fork subdivision of the White River basin.

Glacial meltwater channels occur in the southern part. This is noticeable in the valleys of the Walnut Creek system. Part of the filled valley is drained in a northerly direction by Sanitary Ditch. Stream dissection is greatest along Sugar and Eagle creeks. Surface drainage is best developed in the uplands adjacent these valleys. There is a watershed divide extending through the south-central part to the northeastern corner. The crests of sections of moraines more or less mark local watershed divides in the county. The presence of morainic areas in the southeastern and northeastern parts intensifies the densities of the drainage patterns. Some control of streams and some stream deflections can be attributed, at least partially, to the moraines. Eagle Creek flows through a morainic area. The course of Prairie Creek is probably influenced by the moraine. Noticeable is the north-south meandering course of Fishback Creek. Streams in the southwestern corner have southwesterly courses which are nearly parallel. Several streams have their sources in the general south-central part; they flow in nearly all directions from this area.

Boone County contains no natural lakes. There are a number of ponds; many are farm ponds, others are water-filled gravel and borrow pits or are of various other origins.

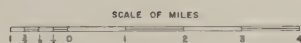
Numerous ditches have been constructed throughout the several sections of the county. Streams have been dredged.

Note: The drainage map was prepared from 1939 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1954.



DRAINAGE MAP BOONE COUNTY INDIANA

PREPARED FROM
1939 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1954



BROWN COUNTY

GENERAL NATURE OF THE COUNTY

Brown County is located in the south-central part of the state. Its area is approximately 324 square miles (1). Nashville, the county seat, is 40 miles south of Indianapolis.

Mean annual precipitation is 41.32 inches at Hickory Hill (2). An average annual snowfall of at least 15 inches can be expected.

All Brown County is included with the limits of the Norman Upland physiographic region of the state (3). In respect to its physiographic situation in the United States most of the county is in the Highland Rim Plateau section of the Interior Low Plateaus province. Only the glaciated northern and eastern portions of the county have been included in the Till Plains section of the Central Lowland province (3).

The surface of Brown County is that of a severely dissected upland plain. Maximum local relief is about 400 feet (3). Weed Patch Hill, about 5 miles southeast of Nashville, has an elevation of more than 1,000 feet above sea level (3). In general, three nearly parallel ridges traverse the county in an east-west direction. These ridges have rather steep slopes and stream valleys are for the most part V-shaped. Only the three main streams have alluvial lands and terraces of any extent. The terraces occur at varying heights above the stream beds. Bedrock terraces occur along Bean Blossom and Salt creeks. The perfection and symmetry of the drainage lines are notable features. Short spur ridges extend from the main ridges in most areas. In the glaciated areas the tops of the ridges are broadened; slopes are not as steep as in the residual areas.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. The northern and eastern parts of Brown County lie within the glaciated region of the state, the remainder of the county being in the driftless area. Rock outcrops in nearly all parts of the county. Bedrock is of Mississippian age, and consists of shales, siltstones, sandstones, and some limestones. There are a few remnants of limestone on the tops of the hills in the central and western parts of the county; but, in general, no limestone caps the Knobstone escarpment.

Glacial drift is of Illinoian age except in a very small area in the northeastern corner of the county where the surface drift is reported to be Wisconsin in age (3)(28). Much of the drift has been removed by erosion. Stream terraces of glacio-fluvial outwash materials occur in the valleys of Bean Blossom Creek, and North Fork Salt Creek. Morainic topography is blended with the dissected terrain.

Soils of the county have been derived from residual and glacial materials (5)(35). In much of the upland area residual soils belong to the Zanesville catena. Soils developed from Wisconsin drift are of the Russell catena. The soils of Illinoian drift belong to the Cincinnati catena. Alluvial soils are of the Pope catena. A few depressions contain soils of high organic content. Most subsoils of the county are slowly permeable (6). Some subsoils in the north-central part are very slowly permeable. Some stream valley subsoils are permeable.

In the northern third of the county stream gravels are of drift origin (7)(10). Otherwise, they consist of fragments of local rocks. Layers of glacial gravels are found on the bedrock terraces in the Bean Blossom and Salt creek valleys.

DRAINAGE FEATURES

The northwest corner of Brown County lies within the West Fork subdivision, and the remainder of the county is in the East Fork subdivision of the White River drainage basin of the state (3).

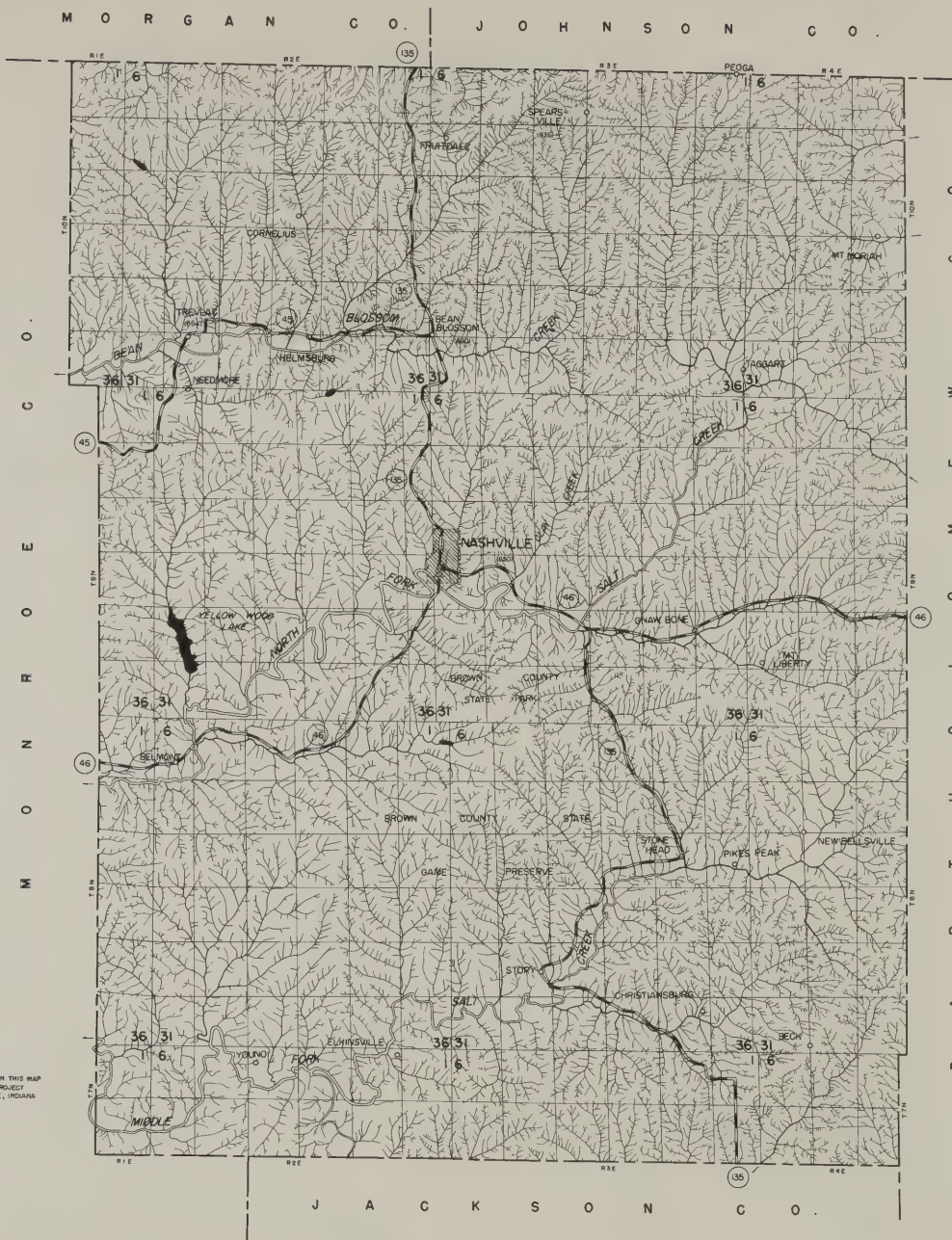
Drainage is integrated in many upland areas, with very little nearly level land remaining. Natural drainage is well developed in almost all parts. Many streams flow on rock. These streams may exhibit minor deflections due to resistant and nonresistant strata of rock. Bean Blossom and Salt creek valleys acted as glacial sluiceways. The over-all trend of drainage is in a general westerly direction through the three major streams which flow roughly parallel to the main ridges. The south-flowing tributaries of these streams are much longer than the ones flowing north. Watershed divides are a short distance south of the main streams. The south-flowing tributaries, especially in the western part, exhibit a remarkable tendency toward parallelism and straightness. Except, perhaps, for a slightly finer density, drainage patterns in the drift areas are similar to those in the unglaciated portion of the county because of the influence of similar underlying rock strata and the thin drift cover. Middle Fork Salt Creek exhibits strong rock control in the southwestern part of the county. Noticeable is the north-south direction of the headwater streams of both Bean Blossom and North Fork Salt creeks. A watershed divide lies along the crest of the Knobstone escarpment in eastern Brown County and western Bartholomew County; it is defined by the arrangement of the stream systems. Schooner Creek flows nearly parallel to North Fork Salt Creek. Sections of both North Fork Salt Creek and Middle Fork Salt Creek flow in a north-south direction near Belmont and Youno, respectively; the channels appear controlled strongly by the bedrock conditions. Most tributaries of the main streams rise in the county.

There are no natural lakes in the county. Artificial lakes, such as Yellow Wood Lake, and ponds of various origins exist through the area.

Few ditches are required to supplement the excellent natural drainage system. These are usually found in the valleys.

A stream gaging station is located on North Fork Salt Creek near Belmont (12). The drainage area of North Fork Salt Creek above Belmont is about 106 square miles (12).

Note: The drainage map was prepared from 1939 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1946.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP BROWN COUNTY INDIANA

PREPARED FROM
1939 AAA AERIAL PHOTOGRAPHS
BY
STATE HIGHWAY COMMISSION OF INDIANA
AT
PURDUE UNIVERSITY
1946



POLYCONIC PROJECTION

DRAWN BY: W.C. RENFRANZ
REDRAWN BY: H.Y. FANG (1956)

CARROLL COUNTY

GENERAL NATURE OF THE COUNTY

Carroll County is located in the north-central part of the state. Its area is approximately 374 square miles (1). Delphi, the county seat, is 65 miles north-northwest of Indianapolis.

Mean annual precipitation is 37.75 inches at Delphi (2). An average yearly snowfall of from 20 to 25 inches can be expected.

Most of Carroll County is in the Tipton Till Plain physiographic region of the state (3). A small portion in the northern part of the county is in the Kankakee Lacustrine section of the Northern Moraine and Lake region. In respect to its physiographic situation in the United States this northern part is in the Eastern Lake section of the Central Lowland province, and the remainder is in the Till Plains section of the same province (3).

The surface of the county is that of a glaciated plain broken by the valleys of the Wabash and Tippecanoe rivers and their tributaries. Morainic ridges are integral portions of the terrain in the southeastern and northwestern parts. Maximum local relief is about 100 feet (3). Till plain areas have some shallow basins. Till plains are slightly rolling. The Wabash Valley is the most prominent feature of the county. The Wabash and Tippecanoe rivers are rather deeply entrenched. Morainic features in the southern part are rather inconspicuous. In the northern part there are some outstanding knolls. Numerous basins are found southeast of Delphi. North of Delphi there is an abandoned valley, partially filled with glacial materials. Intermorainic areas in the northern part are slightly rolling.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. The bedrock consists of strata of Devonian and Silurian ages. Limestone is exposed at Delphi and Lockport. Shale outcrops near Delphi and Rockfield (30). Limestone occurs in the bed of the Tippecanoe River in the northwest part of the county (30).

All Carroll County was glaciated (30). The surface drift is Wisconsin in age. The drift varies in thickness to more than 200 feet (4). This is in accordance with preglacial bedrock topography; it is probably deepest in the subsurface valley of the preglacial Teays River (13). The northwestern third of the county has morainic sections which were probably deposited by the Lake Michigan ice lobe (10). In the southeast corner a ridge of the Bloomington morainic system nearly parallels the southern border of the county.

The soils have been developed mainly from glacial drift materials, some of which have been reworked by wind and water (5). In the moraine and till plain areas soils belong to the Russell and Miami catenas. Soils of the Genesee catena are found in the bottom lands. Fox and Oshtemo soils occur on the granular deposits. Clyde and Cope soils occur in depressed areas having high organic content. Muck and/or peat occur in several depressions. The northwestern half of the county has very permeable subsoils although in small areas they are moderately to

slowly permeable (6). In the southeastern half the subsoils are moderately to slowly permeable depending upon topography. River valleys have very permeable subsoils.

Deposits of granular materials are scattered over the county. Granular terraces occur in the Wabash and Tippecanoe valleys and along Wildcat and Deer creeks (7). Areas producing sand and gravel are located in the northwestern and southeastern thirds of the county. Subsurface deposits of granular materials exist in various places. A group of knolls containing granular materials is found northeast of Delphi. Some sand occurs in the northern part.

DRAINAGE FEATURES

Carroll County lies within the Wabash drainage basin of the state (3). The western part of the county is in the Tippecanoe subdivision and the southern part is in the Wildcat subdivision of the drainage basin.

The Wabash Valley acted as a glacial sluiceway. Surface drainage is best developed in the uplands adjacent to the valleys of the Wabash River and other principal streams. Near Delphi, Deer Creek flows through a rocky gorge. Rock Creek flows through rock in the county. Terraces occur at intervals in the Wabash Valley. The crests of sections of moraines mark watershed divides in the county. The presence of the moraines adds somewhat toward intensifying the densities of the drainage patterns. Some control of stream courses and some stream deflections can be attributed, at least partially, to the moraines. Tributaries of the Wabash River from the north cross morainic areas. These streams are relatively small. Noticeable is the sharp bend of Rock Creek near the Wabash River. A watershed divide in the western side of the county lies close to the Tippecanoe River. There are no major tributaries to the Tippecanoe River in the county. Streams in the southern part have a very definite westerly trend. This is true of Deer Creek and Rock Creek, also. Bridge Creek appears to be rock controlled in its bend south of Delphi. The course of Middle Fork Rock Creek, in the southern part of the county, appears to be controlled by the moraine.

Lake Freeman is a large artificial lake formed in the Tippecanoe River. Ponds of various origins are scattered throughout the county.

Ditches have been constructed to improve sluggish drainage conditions.

Stream gaging stations are located on the Wabash River at Delphi, on Deer Creek near Delphi, and on Wildcat Creek at Orvasco (12). The drainage area of the Wabash River above Delphi is about 4,570 square miles (11).

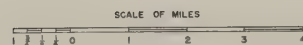
Note: The drainage map was prepared from 1939 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1954.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP CARROLL COUNTY INDIANA

PREPARED FROM
1939 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1954



POLYCONIC PROJECTION

DRAWN BY : M. E. HOOVER

CASS COUNTY

GENERAL NATURE OF THE COUNTY

Cass County is located in the north-central part of the state. Its area is approximately 415 square miles (1). Logansport, the county seat, is 70 miles north-northwest of Indianapolis.

Mean annual precipitation is 36.90 inches at Logansport (2). An average annual snowfall of about 25 inches can be expected.

The southern half of Cass County is in the Tipton Till Plain physiographic region of the state (3). The western fourth of the northern half is in the Kankakee Lacustrine section of the Northern Moraine and Lake region, and the remainder is in the Steuben Morainal Lake section of the Northern Moraine and Lake region. In respect to its physiographic situation in the United States the southern half of Cass County is a part of the Till Plains section of the Central Lowland province and the northern half is in the Eastern Lake section of the same province (3).

The surface of Cass County is that of a glaciated plain. The southern part is only slightly broken by stream dissection. The northern half is rolling due to the presence of moraines. Greatest dissection is along the Wabash Valley. Maximum local relief is about 120 feet (3). The Wabash Valley is the most prominent feature of the county. Morainic topography is of the kettle-kame type north of the Wabash River; in the northeastern part it is swell-and-sag type with few basins. The southern part of the county is a gently undulating plain. Till plains have some shallow basins. Wind action has modified the terrain, for sand dunes occur in the northwestern and northeastern parts of the county. Glacio-fluvial areas have slight relief. Terraces occur at intervals in the Wabash Valley.

The surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock consists of strata of Devonian and Silurian ages. Rock outcrops at various places in the Wabash Valley and at Adamsboro in the Eel River valley. It is also found along portions of Rock and Deer creeks (30).

All Cass County was glaciated. Surface drift is Wisconsin in age (3). The thickness of the drift varies from a few feet to more than 300 feet according to the preglacial topography (13). It is deepest in the subsurface valley of the preglacial Teays River. The Maxinkuckee moraine extends in a south-southwest direction across the county from the center of the northern boundary (10). The Packerton moraine extends in a southwesterly direction diagonally across the county from the northeast corner. A small portion of the Union City moraine is found near the Wabash River in the central-eastern part. It is only slightly rolling and has but few hills and basins. This moraine extends across the Wabash River to the Eel River (10).

Soils have developed chiefly on materials of glacial derivation (6)(36). Wind and water action have modified the parent materials in several locations. Some influence of the underlying limestone on soil formation occurs in the Wabash Valley. Upland drift soils belong to the Miami and Russell catenas. Farmington soils overlies limestone. Granular deposits have Fox, Westland, and Oshtemo soils. Sands are Berrien, Plainfield, Newton and Miami soils. Alluvial soils are of the Genesee catena. Muck has been mapped in the depressions, principally in the northern part of the county. Peat is associated with many of the deposits. Most of the northern half of the county has

permeable subsoils (6). In the southern part the subsoils are moderately to slowly permeable. River valleys have very permeable subsoils.

Granular materials occur in the Eel and Wabash valleys and in the valleys of some of the smaller streams (7). Areas producing sand and gravel are found in the central, western, and southern parts. Subsurface deposits of granular materials are present. Some outwash occurs in the northern part (10). The northwest corner of the county is in the great sand area of northwestern Indiana (10). Sand dunes are scattered over this section. The sand ridges show an east-west trend. Sandy tracts (outwash) lie between Lake Cicott and Crooked Creek. Sand dunes on drift occur in the central-western part. A sand ridge extends westward from Lake Cicott.

DRAINAGE FEATURES

All Cass County lies within the Wabash drainage basin of the state, the northeastern part being in the Eel subdivision and the northwestern part being in the Tippecanoe subdivision (3).

The Wabash River divides the county approximately in half. The Wabash Valley acted as a glacial sluiceway. Its valley walls are dissected. Rock Creek encounters rock in the western part of the county (30). Streams in the southern part show a marked westerly trend. The surface drainage is best developed in the uplands adjacent the river and other principal streams of the county. The drainage basin of Eel River is long and narrow. The crests of sections of moraines intensifies the density of the drainage patterns, some of which are haphazard. Some control of stream courses, and some stream deflections can be attributed, at least partially, to the moraines. Eel River flows along the south side of the Packerton moraine. Twelve Mile and Crooked creeks cross morainic areas. Noticeable is the deflected course of Crooked Creek near the Wabash River. Tributaries of Twelve Mile Creek, also, have rather abrupt changes in their courses. The Wabash River flows against the valley wall in places. South of the Wabash River in the western part, only short tributaries flow directly into the river. Likewise, in the central part, only short tributaries flow into the Eel and Wabash rivers from the north. The Pipe Creek valley walls are dissected.

Lake Cicott, located west of Logansport, has no regular inlet or outlet. Ponds of various origins are scattered throughout the county.

Ditches have been dredged, especially in the northwestern part of the county. Basins have been drained.

Stream gaging stations are located on the Wabash River at Logansport and on the Eel River near Logansport (12). The drainage area of the Wabash River above Logansport is about 3,920 square miles (11). Eel River has a drainage area of about 850 square miles (11).

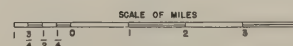
Note: The drainage map was prepared from 1938-1939 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1948.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP CASS COUNTY INDIANA

PREPARED FROM
1938 AAA AERIAL PHOTOGRAPHS
BY
STATE HIGHWAY COMMISSION OF INDIANA
AT
PURDUE UNIVERSITY
1948



POLYCONIC PROJECTION

CLARK COUNTY

GENERAL NATURE OF THE COUNTY

Clark County is located in the southern part of the state. Its area is approximately 384 square miles (1). Jeffersonville, the county seat, is 115 miles south of Indianapolis.

Mean annual precipitation is 43.03 inches at Henryville State Forest and 42.89 inches at Jeffersonville (2). An average annual snow-fall of less than 20 inches can be expected.

Clark County lies within four physiographic regions of the state. Progressively from east to west, they are: The Muscatatuck Regional Slope, the Scottsburg Lowland, the Norman Upland, and the Mitchell Plain (3). In respect to its physiographic situation in the United States, that portion of the county lying east of the glacial boundary is in the Till Plains section of the Central Lowland province; and the western part is in the Highland Rim Plateau section of the Interior Low Plateau province (3).

The surface of the county ranges from nearly level to quite hilly. The county is a part of two cuestas. In the eastern part, a limestone-capped escarpment rises abruptly from the Ohio River. Adjoining this on the west is a regional slope which is a glaciated plain broken by the valleys of Camp and Fourteen Mile creeks, their tributaries, and other minor streams. Upland interstream tracts are nearly level in this area. Many streams are entrenched. The central part of the county is trough-like. This lowland is a glaciated plain broken by the valleys of Silver Creek and its tributaries. In general this area has broad stream valleys and a few steep slopes. Immediately to the westward, the Knobstone escarpment towers wall-like over the Silver Creek valley. Its stream-dissected face is rugged. Maximum local relief is about 500 feet (3). The western portion of the county is part of a high plain which slopes gently westward. Sinkholes abound in many areas east of Silver Creek and in the extreme western part of the county. They give a pitted appearance to the terrain, especially that part bordering many of the streams. Water often stands for long periods on the undissected interstream divides.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock consists of strata belonging to the Ordovician, Silurian, Devonian and Mississippian ages. Limestones and shales outcrop in many places throughout the eastern and central parts of the county. Sandstones, shales and limestones are exposed in the western part. Shale outcrops in the Silver Creek and upper Fourteen Mile Creek valleys. Drift-covered shale ridges are found in the western part of the Scottsburg Lowland.

The eastern and central parts of the county were glaciated (3)(28). The western boundary of glaciation is an irregular line near the foot of the Knobstone escarpment. Glacial drift is of Illinoian age. It is deepest at the crests of the interstream divides for much of it has been eroded from the slopes near the streams. In general the drift is thin, ranging from a few feet to 25 feet (or more where irregularities exist in the underlying bedrock) (8).

Surface soils in the interstream areas in the eastern and central parts have been derived from Illinoian glacial drift (6). They belong to the Jennings and Cincinnati catenas. Grayford soils, also are found in this area. Residual soils developed from sandstones and shales and from limestones are found in the western part of the county. They belong to the Zanesville, Hagerstown and Frederick catenas. Bottom land soils belong to the Huntington catena. Local depressions have been mapped near Jeffersonville. Their soils have high organic content. Soils of the Wheeling catena occur in the Ohio Valley. Subsoils in most

of the areas are slowly to very slowly permeable (7). Some moderately permeable subsoils occur in the southwestern part. River valley subsoils are mostly permeable.

Granular terraces are found near Bethlehem, Owen, Utica, and Jeffersonville (7). Areas producing sand and gravel are located along the Ohio River. Stream deposits of local bedrock fragments occur in the western part. A deposit of sand is found in the upland near the extreme southwest corner of the county (3). Sand streaks occur in the alluvium of the Ohio River. Lacustrine deposits are to be found along streams entering the Ohio River.

DRAINAGE FEATURES

Clark County lies mostly within the Minor Ohio drainage basin of the state. A small area in the north-central part of the county is in the Muscatatuck subdivision of the White River drainage basin. A small area in the northwest part is in the Blue River drainage basin.

Streams flowing in the shale lowlands meander with little control. Along the eastern border, the Ohio River has a rather narrow valley. The river flows against the valley wall in several places. Very definite changes in drainage patterns can be observed between the eastern, central and western sections. Streams entering the Ohio River along the eastern side of the county have high gradients. Stream valleys are broad and shallow in the central part. Stream valleys in the eastern section of the regional slope are frequently shallow. Low gradient gullies extend for long distances into the gently sloping uplands. A filled abandoned channel of the Ohio River exists north of Jeffersonville. The perfection and symmetry of the drainage lines in the Norman Upland area are notable features. The streams in the eastern half of the county flow from north to south in portions of their courses along what appears to be the strike faces of resistant rock strata. Where streams are deeply incised in limestone the flood plains are narrow and valley walls steep. The watershed divide in the western part is the crest of the Knobstone escarpment. The southwest part of the county is in the watershed of several tributary streams of Indian Creek, which flows in a southwesterly direction across Floyd and Harrison counties to the Ohio River. An excellent example of barbed drainage pattern occurs in the upper reaches of Muddy Fork Silver Creek where that stream has pirated some of the headwater streams of Blue River. Streams in the eastern and central parts reflect the influence of the westerly dip of the underlying bedrock. They also follow the inclination of the regional slope. Streams coursing down the face of the Knobstone escarpment are relatively short and have high gradients. Their cross sections are V-shaped and their divides, sharp-crested. Ohio River terraces and alluvium are marked by long, nearly parallel, intermittent streams. Local basins occur.

The Ohio River falls 23 feet, over exposed bedrock, in about two miles between Jeffersonville and New Albany (3).

There are no natural lakes within the county. Ponds of various origins occur throughout the area.

Ditches have been constructed in the lakebed area north of Jeffersonville and in other low-lying portions of the county. Shallow surface ditches are provided to drain the nearly level Illinoian drift areas.

Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1947.

CLAY COUNTY

GENERAL NATURE OF THE COUNTY

Clay County is located in the central-western part of the state. Its area is approximately 364 square miles (1). Brazil, the county seat, is 55 miles west-southwest of Indianapolis.

From data obtained in surrounding counties, the mean annual precipitation should be approximately 40 inches (2). An average annual snowfall of about 20 inches can be expected.

Most of Clay County lies within the Wabash Lowland physiographic region of the state (3). The extreme eastern and northeastern parts are in the Crawford Upland. In respect to its physiographic situation in the United States the entire county is included in the Till Plains section of the Central Lowland province (3).

The surface of Clay County is that of a glaciated plain dissected in part by Eel River and its tributaries. Maximum local relief is about 160 feet (3). The terrain has been modified somewhat by wind action. There is some relatively level upland northeast of Brazil. The Eel River valley flood is broad and nearly flat. The terrain bordering Otter and Croys creeks is dissected. The basin of Splunge Creek is nearly flat.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in origin. Bedrock in the east-central part of the county consists of limestones, shales, and sandstones of Mississippian age. In the remainder of the county the bedrock is of Pennsylvanian age. The rocks outcrop in many sections. Coal outcrops in many places. Rock forms the beds of some of the streams of the county.

All Clay County was glaciated (3). Surface drift is of Illinoian age (9). The drift varies in thickness according to the preglacial topography. The drift has been eroded from many of the valleys. Glacial striations are found in some areas.

The soils of the county have been derived largely from glacial materials (5)(37). Soils in the Eel River valley have formed from materials reworked by water. Some wind reworking is evident. Underlying rock has affected their development to a certain extent in certain parts. Illinoian drift soils belong to the Cincinnatian catena. Cory soils occur in this area, also. Sand areas have Princeton soils. Alluvial soils belong to the Genesee and Pope catenas. Depressed areas often contain soils of high organic content. Subsoils throughout nearly all the county are mostly slowly to very slowly permeable (6). River valley subsoils are permeable.

Granular materials have been obtained in various parts of the county, including the bed of Eel River (7). Areas producing sand and gravel are located in the northwestern part. There are some sand areas bordering the eastern edge of the Eel River valley. Sand streaks occur in the alluvium of the river.

Deep loessial deposits have been mapped in the northwestern corner of the county (20).

DRAINAGE FEATURES

Clay County lies within two major drainage basins of the state, the Wabash and the White (3). The northwest corner and the southwest corner are in the Wabash basin and the remainder of the county is in the Eel subdivision of the White River basin.

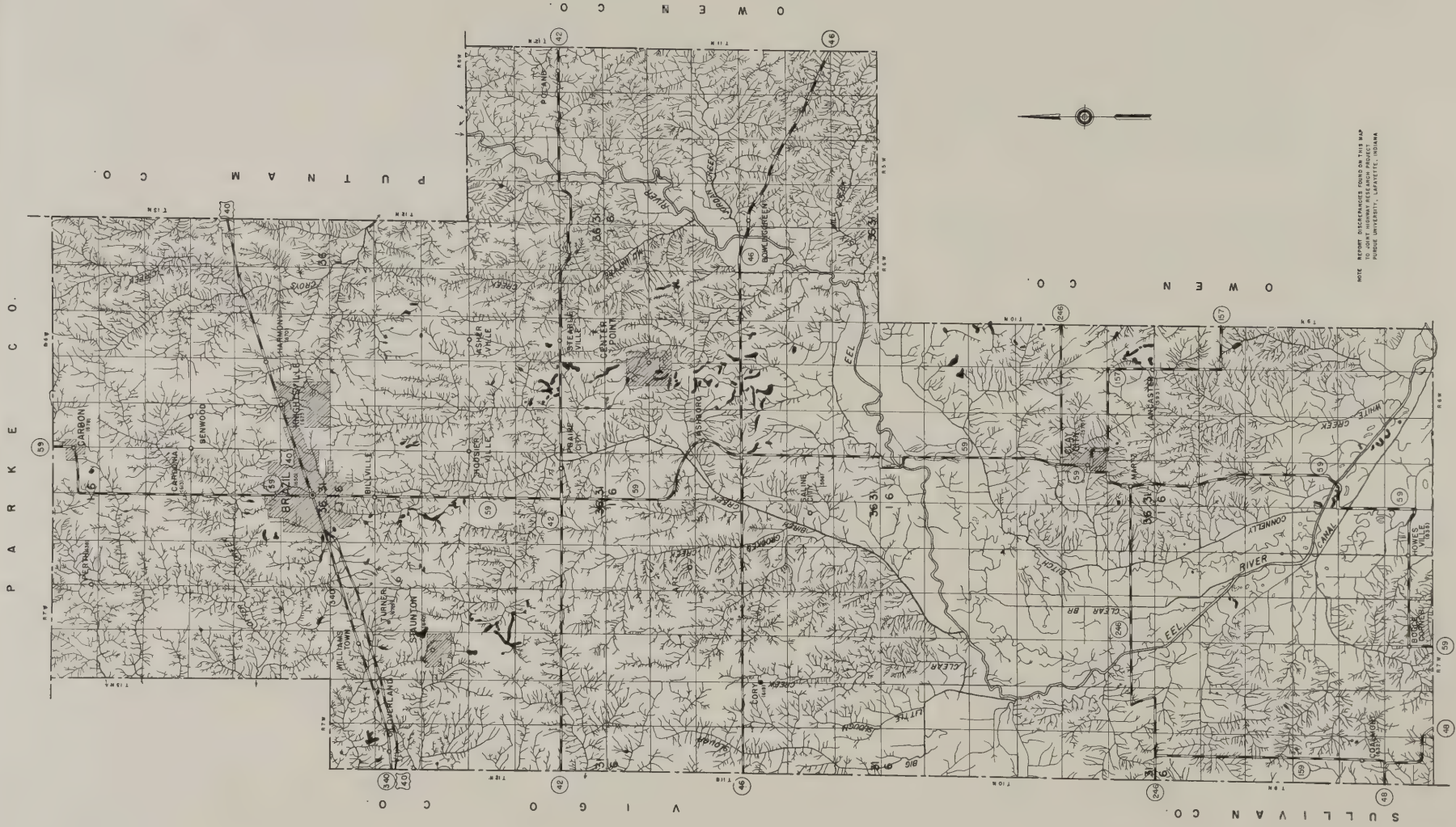
Surface drainage is rather well developed in the eastern part of the county. Drainage patterns are fine-textured in most of the dissected uplands. A singular feature of drainage in the county is the abrupt change in direction of Eel River from a southwesterly to a southeasterly flowing stream. Streams in the southeastern part have a tendency toward following the same curving course of Eel River. Eel River has a very low gradient. Splunge Creek, also, has a low gradient; its valley is low-lying in respect to the Eel River valley. A remnant of the Wabash and Erie Canal still exists in the southwestern part. Flood water flumes occur in the Eel River valley. Many alluviated valleys exist, especially in the central part; these are the Eel River valley and those of its immediate tributaries. The courses of natural drainage have been disrupted by strip mining operations in many parts of the county. The Eel River valley acted as a glacial sluiceway. Several streams have their sources in the north-central part. A watershed divide extends in a northeast-southwest direction through this area. Streams in the northwestern corner have a westerly trend, and in the eastern part they also have a western trend. Otherwise, the general trend is more or less southerly. The headwater streams of Slough Creek flow nearly parallel to each other.

There are no natural lakes in the county. Water-filled strip-mine pits, and ponds of various origins exist in many sections of the county. Bayous along Eel River have also been mapped.

Ditches have been constructed in the Eel River bottoms, and streams have been dredged in other parts of the county. Connelly Ditch and Birch Creek are examples. The former is an intercepting ditch at the foot of the eastern valley wall.

A stream gaging station is located on Eel River at Bowling Green (12). The drainage area of Eel River above Bowling Green is about 832 square miles (12).

Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1947.



NOTE: DISTANCES SHOWN ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP
CLAY COUNTY
INDIANA

PREPARED FROM
1939 AAA AERIAL PHOTOGRAPHS

BY
STATE HIGHWAY COMMISSION OF INDIANA

AT
PURDUE UNIVERSITY

1947



CLINTON COUNTY

GENERAL NATURE OF THE COUNTY

Clinton County is located in the north-central part of the state. Its area is approximately 407 square miles (1). Frankfort, the county seat, is 40 miles northwest of Indianapolis.

Mean annual precipitation is 40.07 inches at Frankfort (2). An average annual snowfall of about 25 inches can be expected.

Clinton County lies entirely within the Tipton Till Plain physiographic region of the state (3). In respect to its physiographic situation in the United States it is in the Till Plain section of the Central Lowland province (3).

The surface of the county is that of a glacial plain, broken by the valleys of Wild Cat and Sugar creeks and their tributaries. Maximum local relief is about 100 feet (3). Generally the terrain is moderately rolling in the close proximity of the major streams. Morainic ridges are relatively inconspicuous except in the northern part where the surface is undulating. Intermorainic areas are gently rolling. Plain tracts are common. In the west-central part, there is a sizeable tract of nearly level land. In general the county is nearly a plain rising gradually to the southeast part.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both glacial and recent in origin. The bedrock in the eastern part of the county is limestone of Devonian age. In the western part it is Devonian shale except in a small area in the southwestern part where strata of Mississippian age underlie the glacial drift. There are no known outcrops of rock in the county.

All Clinton County was glaciated. Surface drift is Wisconsin age. The drift thickness varies from 50 to 300 feet according to the preglacial topography (4). The Bloomington morainic system crosses the county in a northwest-southeast direction in four nearly parallel ridges. They are united in a single mass along the eastern border of the county (10). The morainic ridges are relatively inconspicuous.

The soils of the county have been developed from glacial materials (5). Soils of the morainic and till plain areas belong to the Russell and Miami catenas. Soils of the Parr catena are found in the western part. Terrace soils belong to the Fox catena. Soils of the Genesee catena occur in the bottom lands. Clyde soils are found in depressions. Areas marked as depressions contain soils high in organic content. Some have muck and/or peat in them. The subsoils vary from moderately permeable to slowly permeable (16).

Granular materials are generally found in the bluffs, terraces, and flood plains of the principal streams (7). Areas producing sand and gravel are located in the central, northern and western parts. Gravel has been found along Wildcat Creek, Killmore Creek, Campbells Run, and Potato Creek. Much of the gravel is found beneath the ground water level.

DRAINAGE FEATURES

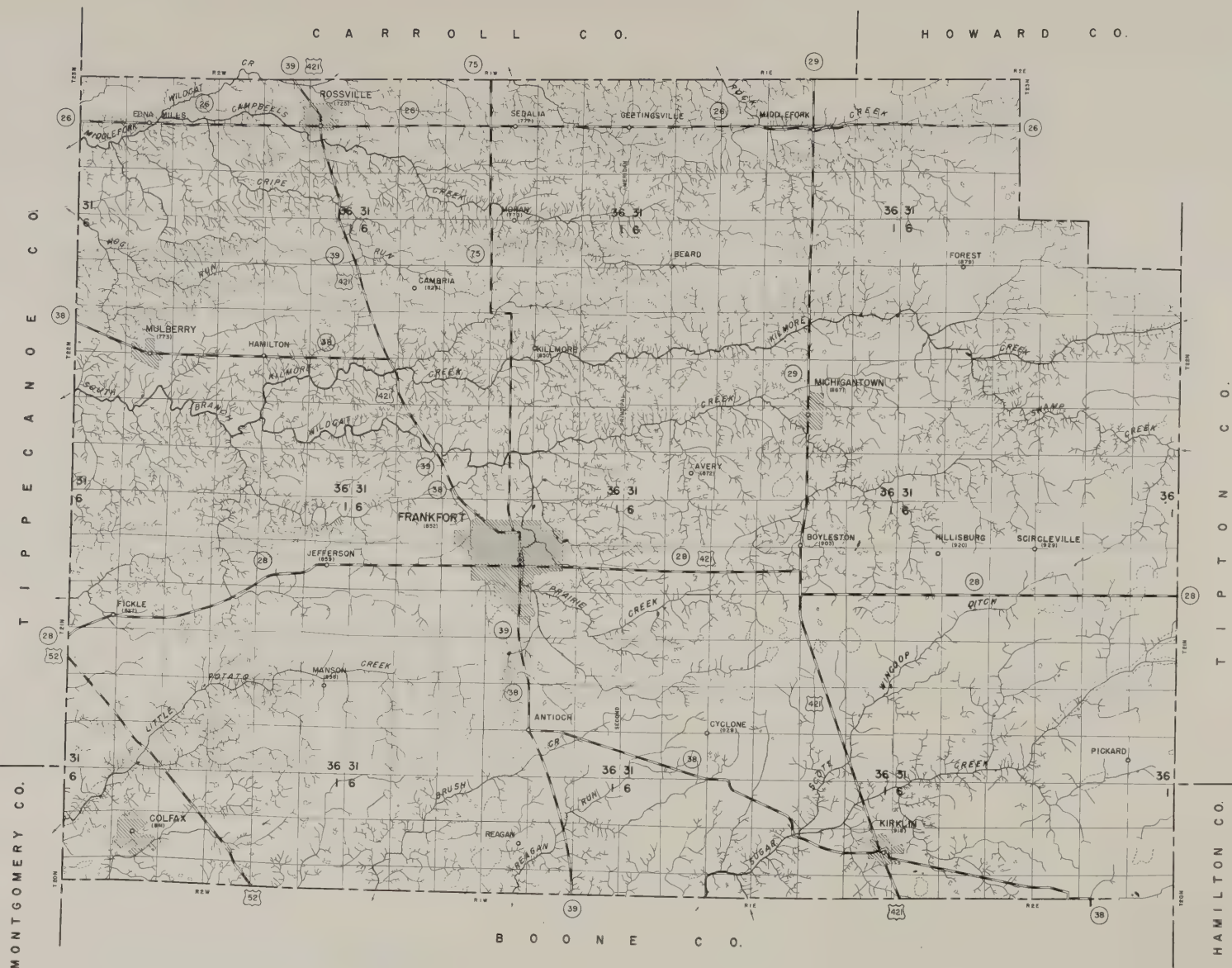
Clinton County lies almost entirely within the Wabash drainage basin of the state, only a small area in the southeast corner being in the White River drainage basin (3). About two-thirds of the county (the northern part) is in the Wildcat subdivision of the Wabash basin.

Surface drainage is best developed in the uplands adjacent the valleys of the Wildcat and Sugar Creek systems. Clinton County is approximately divided into thirds by two east-west watershed divides. The crests of sections of moraines mark watershed divides in the county. The presence of the moraines adds somewhat towards intensifying the density of the drainage patterns. The control of some stream courses and some stream deflections can be attributed, at least partially, to the moraines. Noticeable is the tendency toward parallelism of Killmore and South Fork Wildcat creeks. Some headwater streams of Little Potato Creek flow in a northerly direction. The major streams of the county have a very definite westerly trend. The headwater streams of Wildcat Creek show deflections, some of which are curving, as in Prairie Creek. Streams are rather widely spaced in the southern half and extreme eastern parts of the county. Some of the local watersheds are broad and nearly level. Local depressions are shallow basins. Glacial drainage seemed to have followed surface courses in the eastern and southwestern parts. Preglacial drainage was via the sub-surface Anderson Valley.

There are no natural lakes in the county. Ponds of various origins are scattered throughout the area.

A number of streams have been straightened, widened, and deepened by dredging. Ditches have been constructed to improve sluggish drainage conditions.

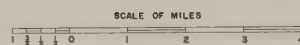
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NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP CLINTON COUNTY INDIANA

PREPARED FROM
1939 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1954



CRAWFORD COUNTY

GENERAL NATURE OF THE COUNTY

Crawford County is located in the southern part of the state. The area of Crawford County is approximately 312 square miles (1). Its county seat, English, is 100 miles south-south west of Indianapolis.

The mean annual precipitation is 50.51 inches at Marengo. At Leavenworth it is 41.82 inches (2). An average annual snowfall of 15 to 20 inches can be expected.

Crawford County is located almost wholly in the Crawford Upland physiographic region of the state. Only a very small portion of the northwest corner of the county is in the Mitchell Plain (3). In respect to its physiographic situation in the United States it is in the Interior Low Plateaus province (3).

The surface of Crawford County is rather rugged for the most part. It is dissected by its major streams. The Blue River is deeply entrenched. Stream bluffs are 300 feet or more in height. Maximum local relief is about 360 feet (3). Sinkholes give a pitted appearance to the terrain in the eastern part of the county in sections where the limestone is near the surface. There is a broad, nearly flat divide in the southeastern part of the county. It lies between Big and Little Blue river systems and extends northward from Fredonia. An occasional outlier of sandstone is to be found breaking the monotony of the gently undulating surface. These sandstone hills present a rugged surface in some parts (3).

Crawford County lies within the unglaciated part of the state, and rock outcrops occur in nearly all its sections. Quaternary deposits exist along the Ohio River and along some of the lesser streams of the county. They are both Pleistocene and recent in age (4). Outcrops of sandstone and limestone occur frequently. Limestone is quarried in various places.

The soils of the county have been developed mainly from residual materials (5). Upland soils belong to the Hagerstown and Zanesville catenas. Soils of the Wheeling catena are found on the Ohio River terraces. Alluvial soils are of the Huntington and Pope catenas. Upland subsoils are mostly slowly permeable (6). River valley subsoils are mostly permeable.

Granular materials in the interior of the county are confined mostly to stream deposits of local bedrock fragments (7). Apparently no sand exists in the county other than in the alluvial deposits of the Ohio River and in the weathered sandstone hills. If loess is present it is thinly deposited, resulting in silty topsoils.

Small lacustrine areas occur along streams entering the Ohio River; these are the result of the glaciation farther north.

DRAINAGE FEATURES

The eastern part of Crawford County lies within the Blue River drainage basin of the state (3). The northwest portion is in the Patoka River drainage basin. The remainder is in the Minor Ohio drainage basin.

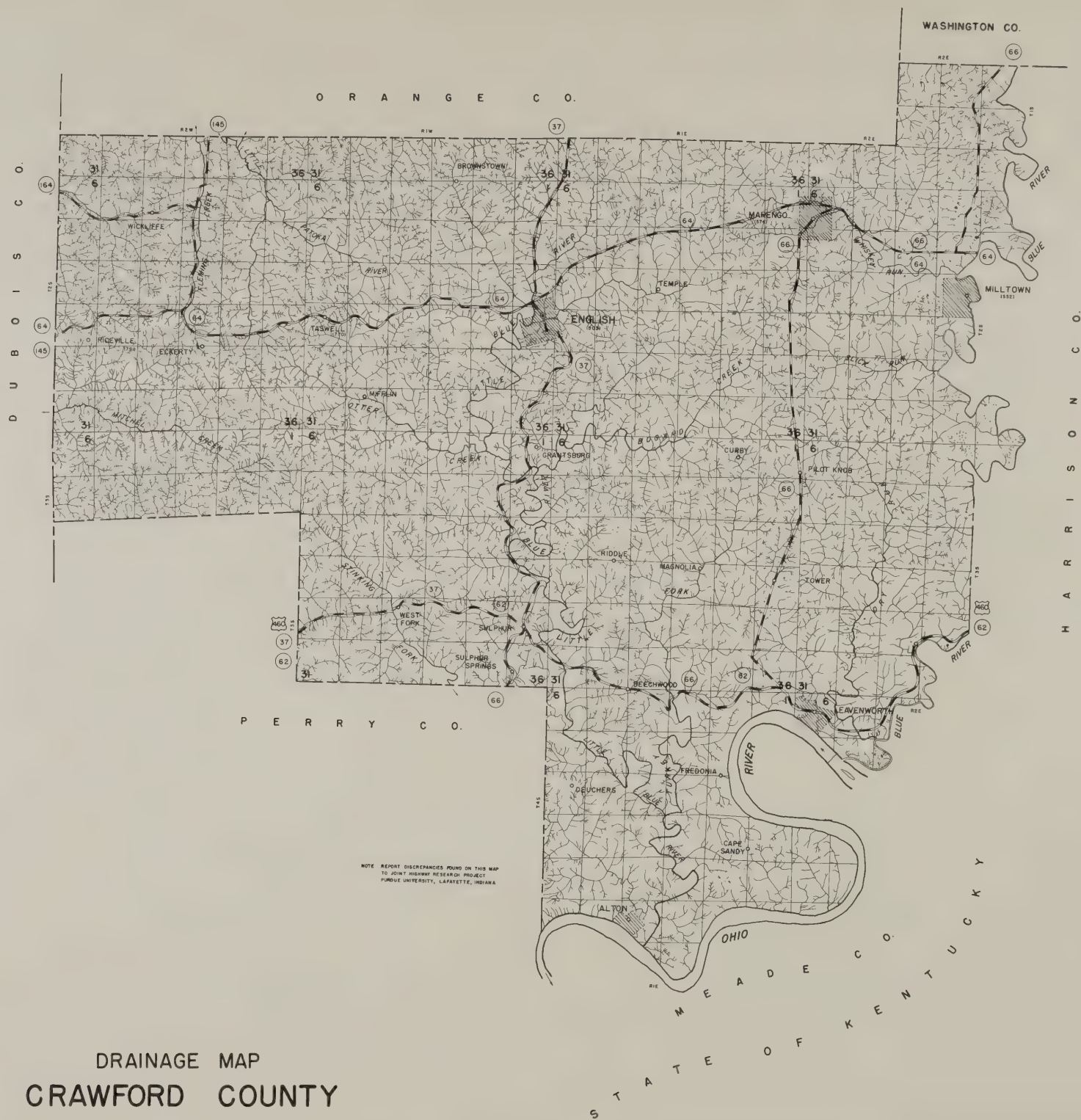
Surface drainage is fully developed in areas along the main streams. Blue River has a narrow valley. The density of the drainage pattern varies according to the type of bedrock and existing topography. The meandering courses of main streams show the effect of rock control. Subterranean drainage is much in evidence in the eastern part of the county. Large springs exist along the Blue and Ohio rivers. Streamless, or semi-streamless valleys are not uncommon in the limestone regions. Caves such as the Marengo and Wyandotte are found in the eastern part. The county is divided into thirds approximately by two north-south watershed divides. Little Blue River and Turkey Fork, though meandering, flow in a north-south direction. These streams appear to be strike streams. Tributaries of Patoka River, such as Fleming Creek, flowing nearly north, show rock control. The Ohio River flows close to its valley wall in several places. Ohio River flood plains are marked by nearly parallel intermittent drainageways. A few depressions exist. Subterranean drainage may or may not contribute to the immediate runoff carried by the streams crossing the area. Streams crossing the Crawford upland are meandering.

There are no natural lakes in the county. Ponds of various origins occur throughout the area.

Ditches have been constructed where necessary to improve drainage conditions.

A stream gaging station is located on the Ohio River at Leavenworth (12). The drainage area of the Ohio River above Leavenworth is about 96,750 square miles (12).

Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1952.



DRAINAGE MAP CRAWFORD COUNTY INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1952



DAVIESS COUNTY

GENERAL NATURE OF THE COUNTY

Daviess County is located in the southwestern part of the state. Its area is approximately 433 square miles (1). Washington, the county seat, is 95 miles southwest of Indianapolis.

Mean annual precipitation is 43.36 inches at Washington (2). An average annual snowfall of about 20 inches can be expected.

Daviess County lies wholly within the Wabash Lowland physiographic region of the state (3). In respect to its physiographic situation in the United States most of the county lies within the Till Plains section of the Central Lowland province. Only a small portion in the southeast corner of the county is included in the Interior Low Plateaus province (3).

The surface of the county is largely a glacial plain which has been dissected by White River, East Fork White River, and their tributaries. The glaciated uplands in the southern and eastern parts are rolling; they are about as equally dissected as the unglaciated uplands. The eastern part of the county has rather high hills with steep slopes. Maximum local relief is about 175 feet (3). Drift areas in the southeastern part are almost flat. The driftless area is considerably dissected. Northeast of Washington is a conspicuous group of hills. Prominent ridges occur in the northeastern part. There are some low hills inside the drift border. The alluviated valleys of the streams are nearly level. Some interstream areas in the eastern part are slightly rolling.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock strata belong to the Pennsylvanian age. Sandstone outcrops in the eastern part of the county. Limestone is found in the southern part. Coal outcrops at various places within the county.

The Illinoian glacier covered most of the county. Only the southeastern corner is in the driftless area of the state. The drift material is rather thin near the drift border; much has been eroded by stream action, making the boundary indistinct in places. The drift is thickest in the lowlands, filling preglacial valleys. In the southeast, a few scattered pebbles mark the drift border north of East Fork White River (9).

The soils of the county have been developed from glacial and, to a small extent, from residual materials (5). Wind and water have reworked much of the glacial and alluvial materials. The soils of the drift-covered upland in the eastern half of the county belong to the Cincinnati catena. Soils of the sandstone areas belong to the Zanesville catena. Sand areas have Princeton soils. Soils of the loessial areas belong to the Alford catena. Lacustrine soils are of the Otwell catena. Fox, Westland and Abington soils occur on the granular deposits. Alluvial soils belong to the Genesee and Pope catenas. Upland subsoils in the eastern half of the county are slowly to very slowly permeable (6). Loessial and sandy area subsoils are mostly permeable. River valley subsoils are mostly permeable.

Gravel occurs in bars in White River (7). Gravels have been found near Cannelburg and in the flood plain of Prairie Creek (9).

Deposits of sand cover the uplands near the White River (9). Another sand area borders East Fork White River. The deposits are thickest next to the river.

Deep loess has been mapped as covering the uplands north and south through the central part of the county (20)(22).

Lakebed deposits are found along Smothers, Prairie, Veales, and Allmans creeks (22).

DRAINAGE FEATURES

Daviess County lies wholly within the White River drainage basin of the state, the northwest portion being in the White River basin proper and the southeast portion being in the East Fork subdivision of the basin (3).

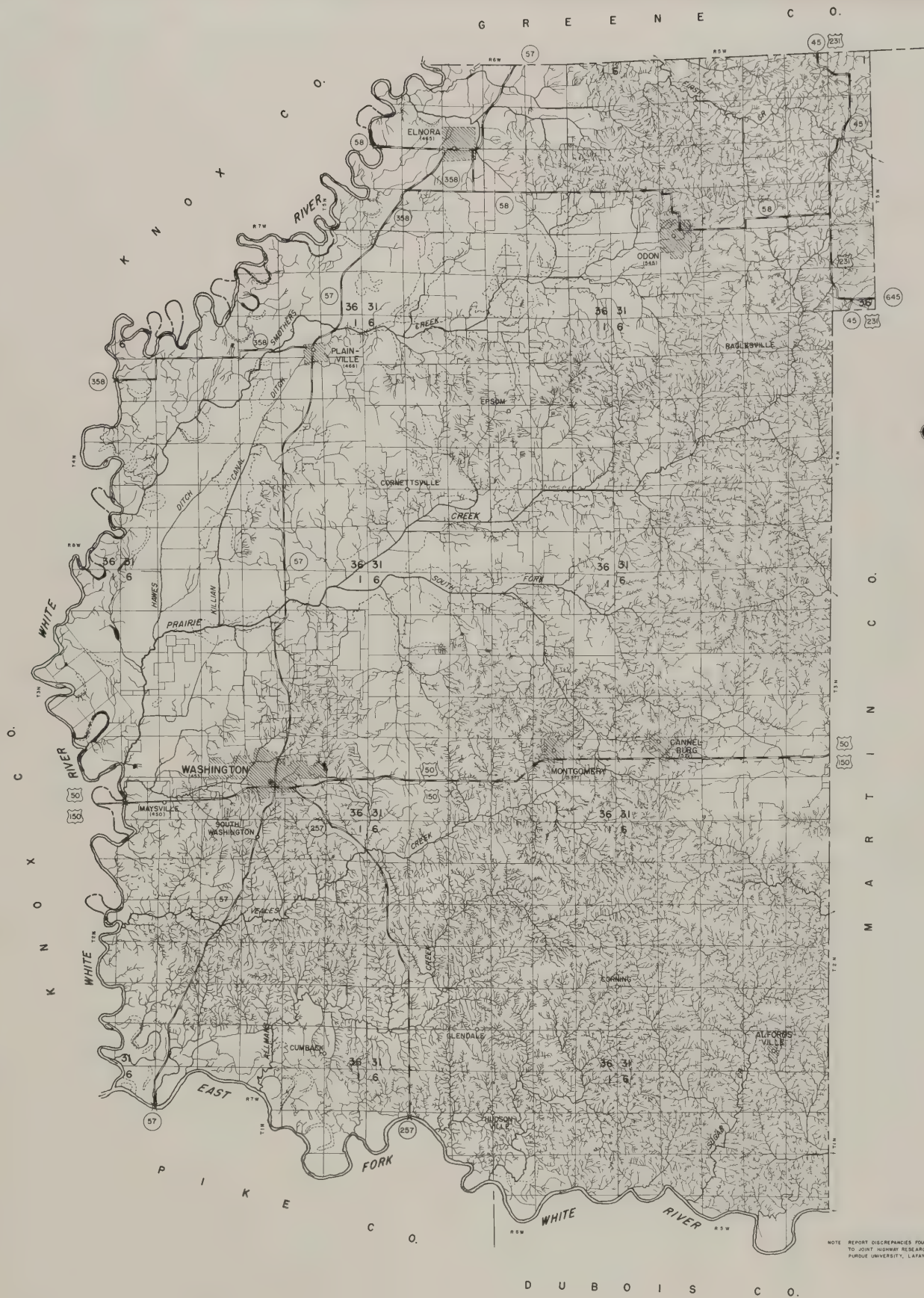
Both the White River valley and the East Fork White River valley acted as sluiceways for the melt waters of the Wisconsin glacier. This accounts for the broad alluvial bottom lands of both streams. Many streams have their sources in the eastern part and flow westerly across the county. Surface drainage systems are well developed in the upland areas and drainage patterns are fine-textured. The White River valley is quite wide in the northern part of the county but narrows somewhat in the southern part. There is practically no difference in the texture of the drainage patterns of the residual area and the adjacent glaciated area. Rather deep valleys exist in the southern part. Many streams have ravine-like valleys in portions of their courses. The East Fork White River contacts rock in its valley wall in places. A watershed divide occurs in the eastern part of the county. Cut-offs in the White River valley have isolated portions of Knox and Daviess counties into island-like tracts. Small streams in the vicinity of the glacial boundary show deflections. Smothers and Prairie creeks show deflections in the White River valley. The northeast headwater streams of Prairie Creek curve in completely reverse directions. In the southeastern part, rather short streams flow directly into the East Fork White River. Streams in the southern part, such as Allmans Creek, have almost zigzag courses, indicating strong rock control. The course of Furse Creek appears to have been effected by glaciation because of its deflected course (9).

There are no glacial lakes in Daviess County. There are, however, numerous ponds of various origins and some artificial lakes. Also, in the bottom lands along White River, there are several bayous.

Nearly all the westerly and southwesterly flowing creeks of the county have been dredged in the portions of their courses which lie in the flood plains of the White River. Also, the courses of those streams have been straightened and deepened where they cross the lakebed lowlands.

A stream gaging station is located on White River at Maysville (12).

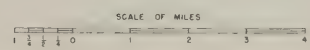
Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1953.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP DAVIESS COUNTY INDIANA

PREPARED FROM
1937 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1953



DEARBORN COUNTY

GENERAL NATURE OF THE COUNTY

Dearborn County is located in the southeastern part of the state. Its area is approximately 306 square miles (1). Lawrenceburg, the county seat, is about 85 miles southeast of Indianapolis.

Mean annual precipitation is 40.73 inches at Moores Hill (2). An average snowfall of about 25 inches can be expected annually.

Dearborn County lies wholly within the Dearborn Upland physiographic region of the state (3). In respect to its physiographic situation in the United States it is in the Till Plain section of the Central Lowland province (3).

Dearborn County is quite hilly with the exception of the northwest corner and the Miami, Ohio and Whitewater river bottom lands which are nearly level tracts. It is that of a glacial plain, in part severely dissected. Maximum local relief is about 400 feet (3). Extensive alluvial lands occur in the Ohio Valley. Scattered sinkholes are found on some of the ridges. Nearly level upland areas are most extensive in the northwestern part of the county. Along the main streams, the valley wall slopes are steep. Extensive terraces are developed along the Whitewater and Ohio rivers. The ridges appear to be even topped and at nearly the same elevation.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both glacial and recent in origin. Bedrock is composed of strata of Ordovician age; they are limestones and shales. Bedrock outcrops on the slopes of nearly every stream valley. It forms the beds of many of these streams.

All Dearborn County was glaciated (3). Although erosion has removed much of the drift in the dissected areas, Illinoian drift still remains on the uplands (28). The drift is thin on the ridge tops near the Ohio River, but slightly thicker in sections farther from the river. No moraines have been identified in the county.

The soils of the county have been derived from glacial and residual materials (5). There has been some reworking of these materials by water. In the northwestern corner the soils belong to the Grayford and Cincinnati catenas. Soils of the dissected areas are of the Switzerland catena. Fox soils occur on the granular deposits. Soils of the Wheeling catena occur in the Ohio Valley. Alluvial soils belong to the Genesee and Huntington catenas. Nearly level upland areas and most sloping areas have slowly permeable subsoils (6). River valley subsoils are mostly permeable. Top soils are silty.

Granular terraces are present in the Ohio and Whitewater river valleys (7). A granular terrace exists near Lawrenceburg. Deposits of fragments of local rocks occur in many of the small stream valleys of the county. Silt terraces are found in the Laughery Creek valley. Other streams entering the Ohio River have lacustrine deposits in their valleys; these are probably the result of flooded conditions due to glaciation.

DRAINAGE FEATURES

The northeast and northwest corners of Dearborn County lie within the Whitewater drainage basin of the state (3). The remainder of the county is in the Minor Ohio drainage basin. A small area is in the Miami basin.

The Ohio River, Whitewater River, and Laughery Creek are deeply entrenched. Also, several other streams have deep valleys in their lower reaches. As a whole the streams of the county have high gradients, although streams originating in the uplands have low gradients and shallow valleys in their upper reaches. Many extend long distances into the gently sloping uplands. Upon entering the river valleys, the gradients of these tributary streams become low once more. Many streams have their sources in the western and northern parts of the county and flow in a southeasterly direction. Laughery Creek, beginning as a south-flowing stream, has turned east-northeast in its course to the Ohio River (3). The Whitewater and Ohio rivers acted as glacial sluiceways (8). Tanners Creek appears to be deflected by a granular terrace in its lower reaches. Drainage is well developed in the uplands adjacent the Laughery Creek, Ohio, and Whitewater river valleys. Many streams flow on rock in portions of their courses. Streams flowing over rock exhibit minor deflections in alignment due to the various resistant and nonresistant strata. Drainage patterns are rather fine-textured in the dissected uplands adjacent the immediate valley of the Ohio River. A watershed divide in the northwestern part is on a nearly level area. Natural drainage in this section is in cases impeded. The watershed divide across the northeastern corner is a definite ridge. The northwest corner drains in a northerly direction. Tributaries of Laughery Creek are rather short. The Miami River makes a short loop into the southeast corner of the county; its flood plains are extensive. The Ohio River flows close to the valley wall south of Aurora. Otherwise, terraces and flood plains separate the river from the valley wall. Several tributaries of East Fork Tanners Creek flow in a southerly direction.

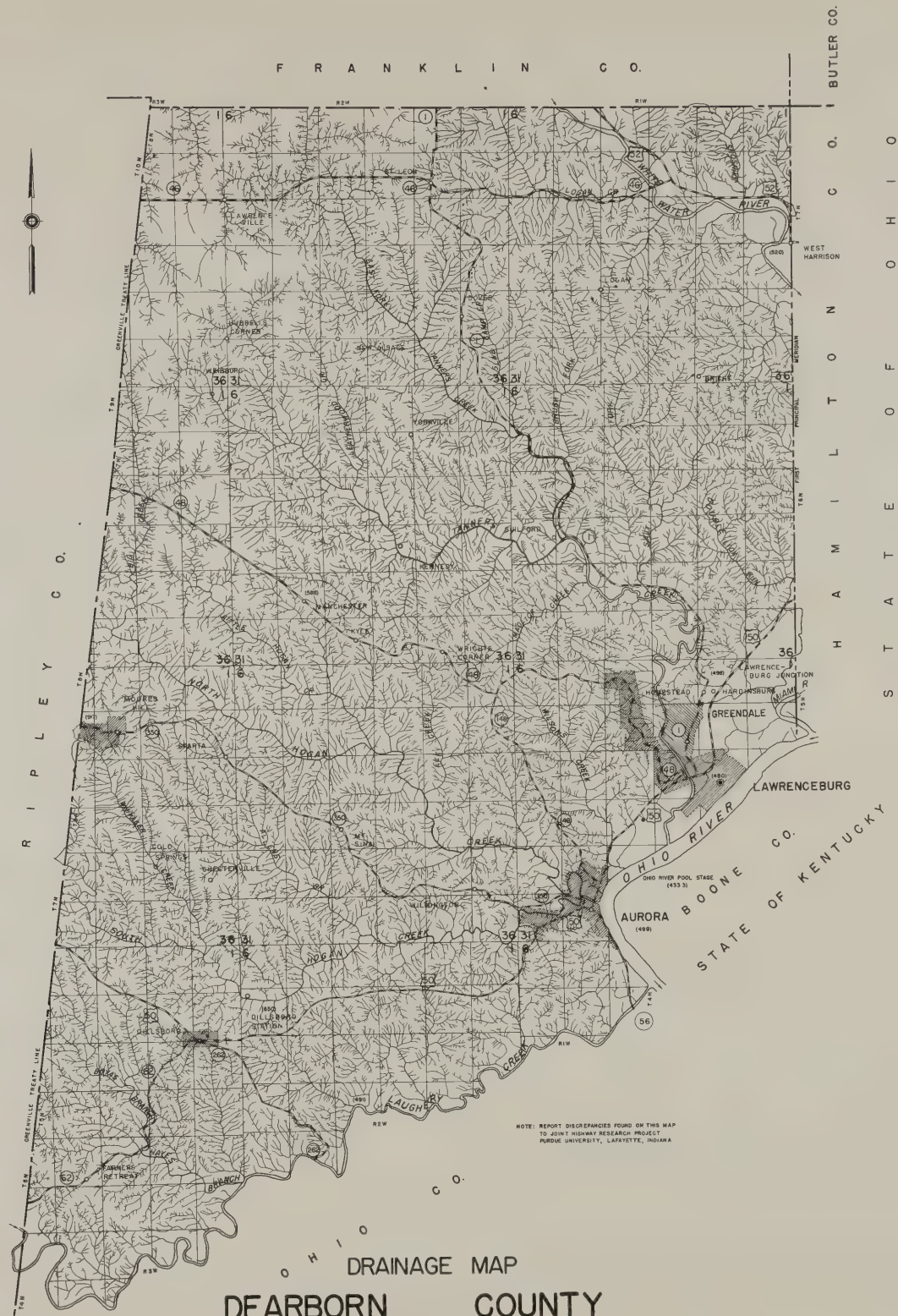
There are no natural lakes in the county. Artificial lakes and ponds of various origins are scattered throughout the area.

In the nearly level areas ditches have been constructed to improve sluggish drainage conditions. Shallow surface ditches drain excess water from fields in the northwestern part of the county.

A stream gaging station is located on Laughery Creek at Farmers Retreat (12).

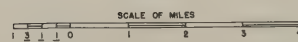
The Whitewater River drainage basin contains more than 1,300 square miles of Indiana territory (3).

Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1947.



DRAINAGE MAP DEARBORN COUNTY INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
STATE HIGHWAY COMMISSION OF INDIANA
AT
PURDUE UNIVERSITY
1947



POLYGONIC PROJECTION

DECATUR COUNTY

GENERAL NATURE OF THE COUNTY

Decatur County is located in the southeastern part of the state. Its area is approximately 370 square miles (1). Greensburg, the county seat, is 50 miles southeast of Indianapolis.

Mean annual precipitation is 40.43 inches at Greensburg (2). An average snowfall of more than 20 inches can be expected annually.

Most of Decatur County lies within the Muscatatuck Regional Slope physiographic province of the state. A small portion in the northeast corner is in the Dearborn Upland (3). In respect to its physiographic situation in the United States it is in the Till Plains section of the Central Lowland province (3).

The surface of the county is that of a glacial plain. It is dissected in varying degrees by the streams. Relief is intensified by sections of morainic systems. Upland interstream areas are gently undulating in the northern part; in the southern part they are nearly flat. Maximum local relief is about 140 feet (3). The topography is the product of glacial deposits and the underlying bedrock. In most cases the alluvial bottom lands along the streams are narrow, although the valleys have a wide variation in width. The highest point in the county is on the divide between Sand Creek and Salt Creek. Sand Creek and Flat Rock River have cut fairly deep valleys. Morainic topography near Kingston is prominent. Sinkholes occur along Sand Creek in the southern part of the county. These give a pitted effect to the terrain locally.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock is composed of strata of Silurian and Devonian ages. Outcrops of rock are found in various parts of the county. Limestone has been quarried in several places, especially in the southern part. Limestone-shale is exposed along Salt Creek. Limestone occurs along Clifty Creek and along Flat Rock Creek.

All Decatur County was glaciated (3). The southeastern third is mantled with Illinoian drift and the surface drift in the remainder of the county is Wisconsin in age (8)(28). The drift is as much as 100 feet thick in places (4). The boundary between the two drifts is noticeably distinct in some areas; in others the topography of stream dissection blends with the ridged drift of the moraine. The colors of the soils of the two drift sheets help to make the boundary apparent. The county is crossed by sections of two morainic systems (8). The Shelbyville moraine makes a wide sweeping curve from the southwest corner to the northeast corner. In the southwestern part the relief is slight but readily discernible. A portion of the Champaign moraine covers the northwest corner of the county.

For the most part soils have been developed from glacial and fluvial materials (5)(38). Underlying limestone has affected them to some extent in the southern part. Upland soils of the Wisconsin glacial drift area are of the Miami and Russell catenas. Upland soils of the Illinoian drift area belong to the Cincinnati catena. Fox soils occur on the granular deposits. Alluvial soils belong to the Genesee catena. Depressed areas contain soils of high organic content. The subsoils in the southeastern part of the county vary from slowly to very slowly permeable (6). In the remainder of the county the subsoils vary from moderately to slowly permeable.

Granular materials have been found in the northwestern part of the county (7). These materials occur in knolls and ridges and in filled valleys (8). Areas producing sands and gravels are located in the central-western part of the county. Deposits of gravel exist along Clifty Creek, Flat Rock River, Mill Creek and Sand Creek in valley walls and terraces. Stream

deposits of sands and gravels are mostly local in occurrence in the southeastern part; they consist mainly of bedrock fragments. There is a ridge of granular material near Burney and knolls of granular material near St. Omer.

DRAINAGE FEATURES

Decatur County lies within three drainage basins of the state (3). The east-central and northeastern parts are in the Whitewater basin. The southeastern part is in the Minor Ohio basin. The remainder is in the White River drainage basin. Of this remainder, the south-central part is in the Muscatatuck subdivision and the rest is in the East Fork subdivision of the White River basin.

The valleys of the principal streams vary in width. The reversal in the direction of the course of Salt Creek is a noticeable feature; its head-water streams flow southeasterly. Many small streams have shallow valleys. There is some subterranean drainage; this occurs along Sand Creek in the southern part of the county where limestone is close to the surface. The north-south watershed divide in the eastern part is distinctive. Natural drainage is best developed along the valleys of the main streams. Natural drainage in interstream areas is impeded in some cases. An abandoned glacial sluiceway is found near St. Paul. In the southern part, low-gradient tributary streams extend for long distances into the gently sloping uplands. With the exception of the eastern part of the county, drainage is in a southwesterly direction. This trend of the long, nearly parallel streams reflects the control exerted on their courses by the regional slope. Also, this is influenced, at least partially, by the dip of the underlying bedrock. Some parallelism is exhibited. Streams are widely spaced in the west-central and southeastern parts. Drainage patterns are noticeably different in the southeastern and northwestern parts. Sand Creek originates within the county. Drainage systems appear to have been affected by the presence of sections of moraines in the county. Local watershed divides, deflections of streams, and intensified densities of drainage patterns occur in the morainic areas. Big Flat River shows considerable deflection in its course across the northwest corner of the county. Deflections occur, also, in Clifty and Sand creeks. These may be the result of a combination of the rock and morainic control. A few shallow basins are scattered over the northwestern half of the county. Flat Rock River and Sand Creek cross morainic areas.

There are no natural lakes in the county. Pond of various origins are scattered throughout the area. There are a few artificial lakes.

Ditches have been constructed to improve drainage conditions in the nearly level areas. In the southern part drainage is accomplished in the interstream areas by shallow surface ditches.

A stream gaging station is located on Flat Rock River at St. Paul (12). The drainage area of Big Flat Rock River above St. Paul is about 303 square miles (12).

Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1948.

S H E L B Y C O.

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DRAINAGE MAP
DECATUR COUNTY
INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
STATE HIGHWAY COMMISSION OF INDIANA
AT
PURDUE UNIVERSITY
1948



DE KALB COUNTY

GENERAL NATURE OF THE COUNTY

DeKalb County is located in the northeastern part of the state. Its area is approximately 365 square miles (1). Auburn, the county seat, is about 130 miles northeast of Indianapolis.

Mean annual precipitation is 32.92 inches at Auburn (2). An average annual snowfall of about 35 inches can be expected.

DeKalb County lies wholly with the Steuben Morainial Lake section of the Northern Moraine and Lake physiographic region of the state (3). In respect to its physiographic situation in the United States it is in the Eastern Lake section of the Central Lowland province (3).

The surface of the county is that of a glacial plain. It is broken by the valleys of St. Joseph River, Cedar Creek, Fish Creek, and their tributaries. The presence of moraines has caused uneven areas. Maximum local relief is about 100 feet (3). Morainic areas are broad, rolling uplands, with many local depressed areas. In some places the morainic features are prominent. Intermorainic areas are not always gently undulating; in some parts they are rather rolling, with swell-and-sag topography. The central part is a plain tract. A glacial channel extends along Cedar Creek.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock is composed of strata of Devonian age in the southern part of the county and of Mississippian age in the northern part. There are no known outcrops of the bedrock in the county.

All DeKalb County was glaciated (3). Surface drift is Wisconsin in age. The drift thickness varies to nearly 400 feet. Much of this is due to the topography of the original bedrock surface. Portions of four moraines cross the county (8). The Ft. Wayne moraine covers the southeast corner. Between the St. Joseph River and Cedar Creek lies the Wabash moraine. The Salamonie moraine traverses the northwest corner where it coalesces with the Mississinewa moraine. The Wabash moraine is a broad, rolling upland (3).

The soils of the county have been developed from glacial materials (5). Some materials have been reworked by water. Upland soils belong to the St. Clair catena. Fox, Oshtemo, and Westland soils occur on the granular deposits. Alluvial soils are of the Genesee catena. Clyde soils are found in the depressions. Organic soils are mucks and peat. Most of the subsoils in the county are slowly to very slowly permeable (6). A small area in the northwestern part has permeable subsoils.

Gravel has been found along Cedar Creek and at various places near Auburn, Butler, St. Joseph and Waterloo (7). Areas producing sands and gravels are located over rather extensive areas scattered throughout the county. Subsurface deposits of granular materials occur in several sections of the county (8). Peat and muck deposits are found in widely scattered areas.

DRAINAGE FEATURES

All DeKalb County has been included in the Maumee drainage basin of the state (3). The central-eastern part drains into Ohio and thence into the St. Joseph River.

The course of the St. Joseph River appears to be controlled by the Ft. Wayne moraine. A rather narrow plain borders this river. The course of Cedar Creek appears to be controlled by the Wabash moraine; it is deflected near Waterloo from a southeasterly flowing stream. Fish Creek crosses the Wabash moraine in a relatively deep valley. It flows into Ohio where it joins the St. Joseph River. Natural drainage is best developed along the valleys of the main streams. Fine-textured, somewhat hap-hazard drainage patterns outline the Salamonie moraine in the northwest corner of the county. The crests of sections of moraines define watershed divides in the county. Control of some stream courses and some stream deflections can be attributed, at least partially, to the presence of the moraines. Drainage patterns can be associated with the topography and surface materials of the morainic areas. Little Cedar Creek is deflected in a broad curve. Many local basins exist throughout the county in the intermorainic areas. Tributaries from the western sides of the main streams are longer than those flowing from the eastern sides; they cross intermorainic areas.

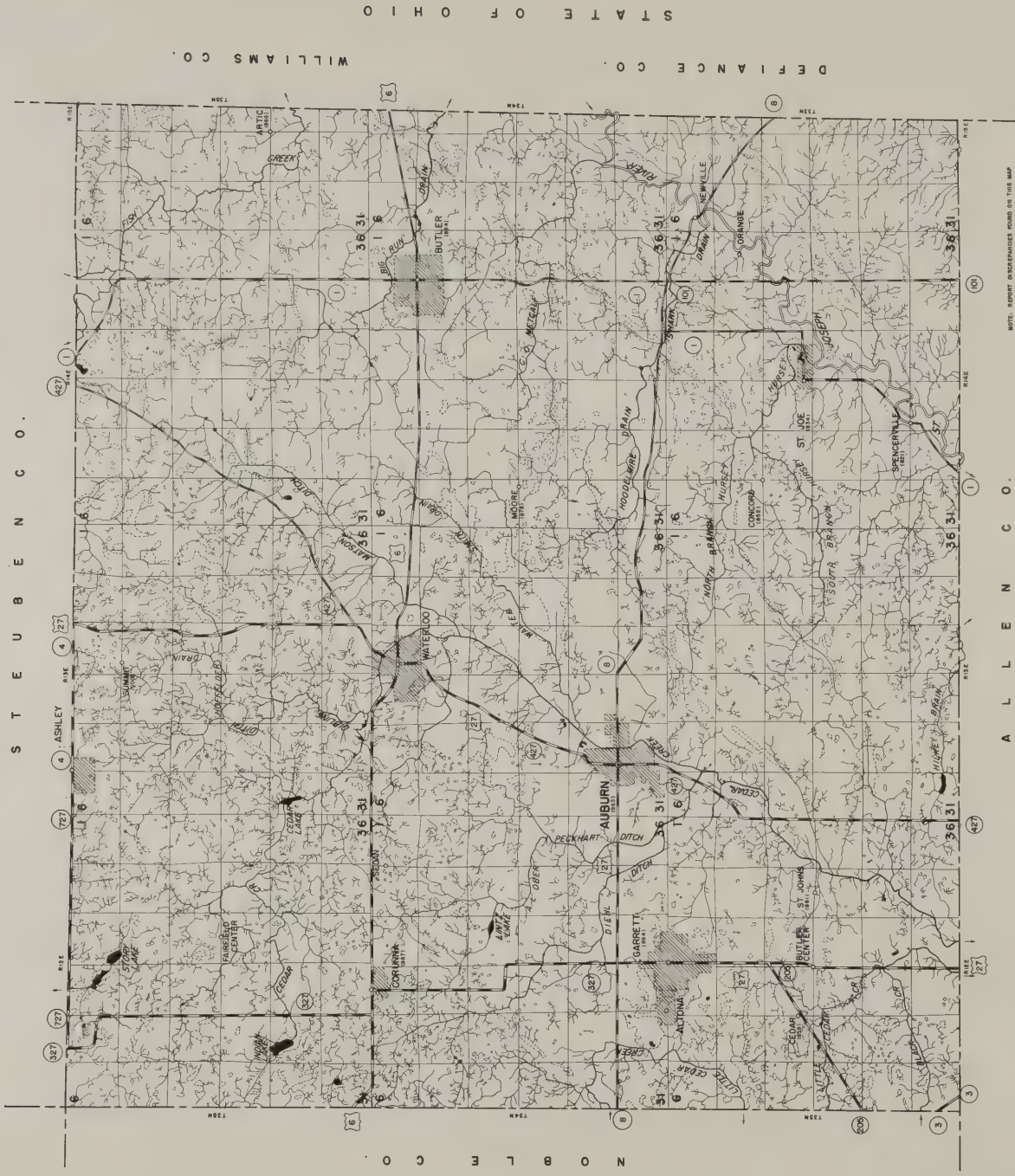
There are a number of lakes scattered throughout the western half of the county. Ponds of various origins exist in the several sections of the county. Lakes tend to stabilize the flow of their outlet streams. A lake gaging station is located on Cedar Lake (12).

Ditches have been dredged to drain basins and improve sluggish drainage conditions. Low dams have been constructed in some of the streams.

Stream gaging stations are located on St. Joseph River near Newville and on Cedar Creek at Auburn (12).

The St. Joseph River drains about 690 square miles of Ohio and Michigan before entering Indiana (3).

Note: The drainage map was prepared from 1938-1939 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1953.



DRAINAGE MAP
DEKALB COUNTY
INDIANA

PREPARED FROM
1938 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1953



DELAWARE COUNTY

GENERAL NATURE OF THE COUNTY

Delaware County is located in the east-central part of the state. Its area is approximately 400 square miles (1). Muncie, the county seat, is 50 miles northeast of Indianapolis.

Mean annual precipitation is 41.20 inches near Muncie (2). An average annual snowfall of from 25 to 30 inches can be expected.

Delaware County lies wholly within the Tipton Till Plain physiographic region of the state (3). In respect to its physiographic situation in the United States it is a part of the Till Plain section of the Central Lowland province (3).

The surface of the county is that of a glacial plain. It is broken by the valleys of the White and Mississinewa rivers and their tributaries. Morainic ridges are integral portions of the terrain in the northeastern, central, and southeastern parts of the county. Maximum local relief is about 80 feet (3). Till plain or intermorainic areas are slightly undulating; scattered shallow depressions are to be found. The most rolling portions are in the northeastern and southeastern parts. Occasionally stream valley walls are steep. There are terraces in the major stream valleys. In the southeastern part some pronounced morainic features occur, including many knolls. Some morainic topography is inconspicuous. There are numerous old filled valleys; they are nearly flat.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock is composed of strata of Silurian age. Rock is exposed in the Mississinewa valley near Eaton and in and near the White River Valley west of Muncie. Quarries have been operated in the vicinity of Muncie and Yorktown.

All Delaware County was glaciated (3). The surface drift is Wisconsinian in age. The drift thickness varies from a few feet to more than 150 feet (4). Sections of three morainic systems are recognized in the county (8). The Mississinewa moraine crosses the northeastern corner. The Union City moraine crosses in an east-west direction near the center of the county. The southeast corner is covered by a section of the Bloomington moraine.

The soils have been developed from glacial materials, some of which have been reworked by water (5). Upland soils are of the Miami and St. Clair catenas. Clyde soils are found in depressions. Alluvial soils belong to the Genesee catena. There are some granular terraces along the major drainageways having Fox soils. Bellefontaine soils are found on the granular knolls and ridges. Many depressed areas contain soils of high organic content. The subsoils in the northeastern quarter of the county are slowly to very slowly permeable (6). Subsoils in the remainder of the county are moderately to slowly permeable.

Gravel has been found along the rivers and major streams in terraces and valley wall deposits (7). Granular materials have been obtained, also, from knolls and ridges. Knolls of granular material lie between Muncie and Smithfield. Granular ridges occur between Granville and Muncie. Old filled

valleys contain granular materials. A granular plain lies along East Fork White River. Areas producing sands and gravels are fairly well distributed over the county, although intermittent. Some peat and muck are found south of White River as well as in a few areas elsewhere.

DRAINAGE FEATURES

The northeastern third of Delaware County lies within the Mississinewa subdivision of the Wabash drainage basin of the state. The remainder of the county is in the West Fork subdivision of the White River drainage basin (3).

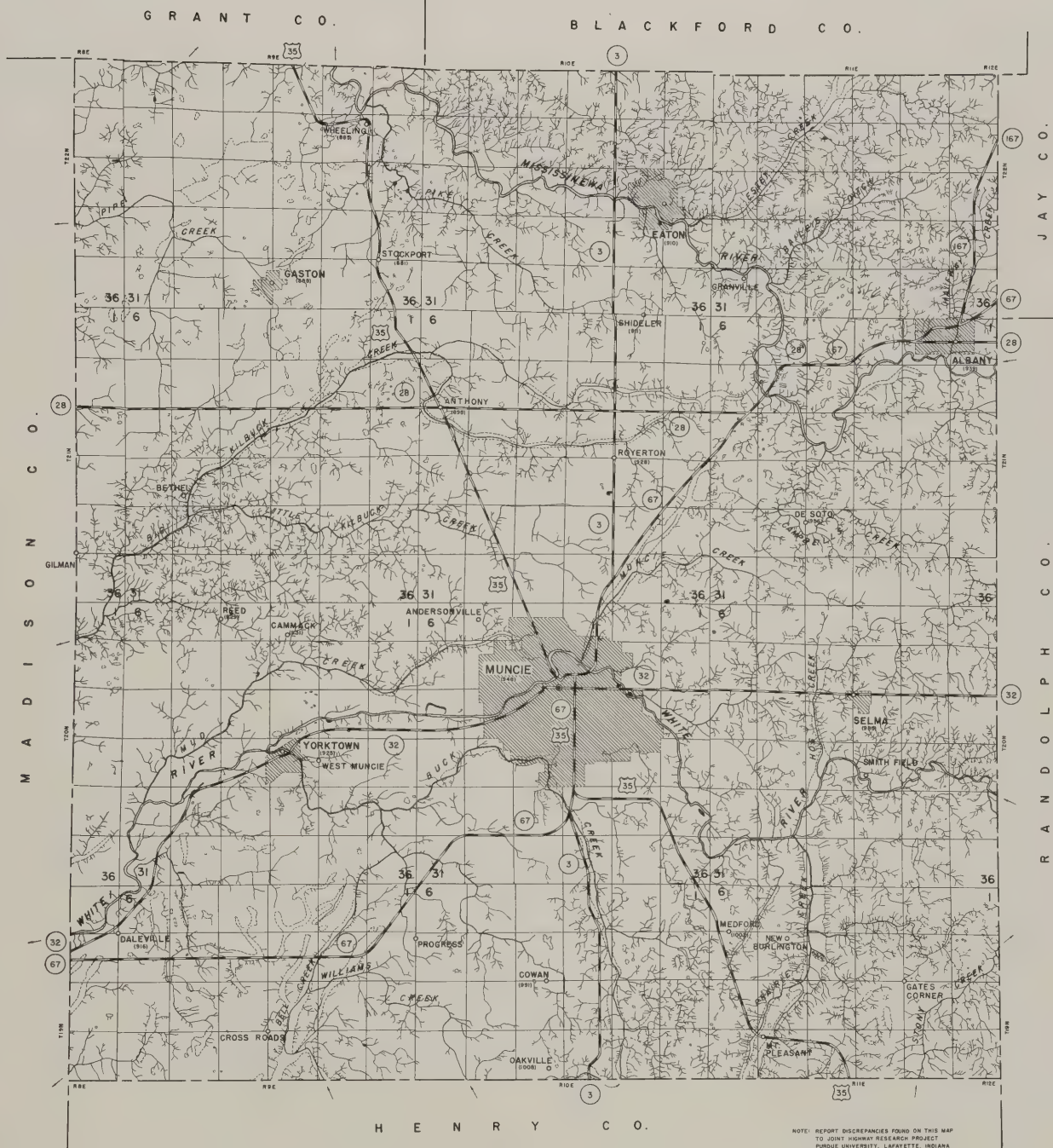
Surface drainage is best developed along the valleys of the White and Mississinewa rivers and their principal tributaries. The Mississinewa River valley is rather shallow. The watershed divide between the White and Mississinewa rivers is a nearly level plain tract. Another nearly level tract lies between Buck and Bell creeks in the southern part. Buck Creek is deflected near White River. Channels of glacial meltwater drainage are conspicuous within the county. These exist along Prairie, Hog, Buck, Bell, Muncie, Mud, Big Killbuck, and Easleys creeks. Stream valleys near the head of Bell Creek are shallow and fairly wide. Dissection is prominent along portions of Prairie, Stony, and Easleys creeks. The Prairie Creek valley in its upper portion is shallow and nearly parallel the rivers prior to features are the tributary streams that nearly parallel the rivers prior to their junctions. The presence of sections of moraines appears to have affected drainage systems in the county. Stream deflection, local watershed divides, and intensified densities of drainage patterns occur in the morainic areas. Streams have shallow valleys near New Burlington. Many streams have tortuous courses. Prominent are some abrupt changes in the courses of the Mississinewa River. Several streams in the southern part also make abrupt changes in their courses; Bell Creek is an excellent example. Many streams in the southern part have northerly courses. White River has veered from the Union City moraine to flow down the dip of the underlying rock. Pike Creek nearly parallels the Mississinewa River. Streams in the northern part have a northwesterly trend exhibiting morainic control. Ditty Creek flows in a northeasterly direction before its course is reversed near White River. The headwater streams of Pipe Creek are deflected westerly. Local basins are scattered in the till plain areas.

There are no natural lakes in Delaware County. Ponds of various origins are scattered throughout the area.

Ditches have been constructed to improve sluggish drainage conditions.

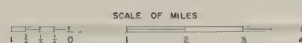
A stream gaging station is located on White River at Muncie (12). The drainage area of White River above Muncie is about 300 square miles (11).

Note: The drainage map was prepared from 1941 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1954.



DRAINAGE MAP DELAWARE COUNTY INDIANA

PREPARED FROM
1941 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1954



DUBOIS COUNTY

GENERAL NATURE OF THE COUNTY

Dubois County is located in the southwestern part of the state. Its area is approximately 433 square miles (1). Jasper, the county seat, is 105 miles southwest of Indianapolis.

Mean annual precipitation is 42.89 inches at the Jasper Power Plant and 48.59 inches at the Huntingburg airport (2). An average annual snowfall of approximately 20 inches can be expected.

The western half of Dubois County is in the Wabash Lowland physiographic region of the state (3). The eastern part is in the Crawford Upland. In respect to its physiographic situation in the United States most of the county is in the Interior Low Plateaus province; only a small area in the northwest corner is in the Till Plains section of the Central Lowland province (3).

The surface of the county is that of a stream-dissected upland. For the most part, it is rolling. Knolls of prominence occur in the northeastern part. Maximum local relief is about 260 feet (3). With the exception of the northwest corner, most of the county is in the unglaciated portion of the state. Drift-covered areas are rolling. Areas of very rolling terrain are to be found in the northeastern part and south and west of Huntingburg.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. The bedrock in a small area in the central-eastern part of the county is of Mississippian age. It is of Pennsylvanian age in the remainder of the county. The strata are shales, limestones, sandstones, and coals. Bedrock outcrops in various parts of the county. Coal outcrops in several places in the county.

A small area in the northwest corner of the county was glaciated (3). Surface drift is Illinoian in age (9). This drift is relatively thin. No moraines have been identified in the county; much of the drift has been removed by erosion. The drift border is indistinct in places.

The soils of the county have developed on glacial, residual, aeolian, and water-deposited materials (5). Illinoian drift soils belong to the Cincinnati catena. Upland soils in the sand areas belong to the Zanesville catena. Sand areas have Princeton soils. Loessial soils are of the Alford catena. Lacustrine soils are of the Otwell catena. McGary soils are also lacustrine. Alluvial soils belong to the Genesee catena. Some Fox soils occur along East Fork White River. Slight depressions have Zipp and Montgomery soils. Subsoils of the county are mostly slowly permeable (6). Lakebed subsoils are slowly permeable. River valley subsoils are mostly permeable.

East Fork White River valley contains little granular materials (7). Some stream valley deposits of local bedrock fragments occur. Some sand is found in the northwestern part. There is a nearly level sand-covered area in the vicinity of Jasper which appears to be lacustrine (9).

Uplands in a small area in the northwest corner have been mapped as being covered with deep loess (20).

Lakebeds of Wisconsin age occur in the northwestern part (9). Typical lacustrine deposits are in glacial Lake Patoka.

DRAINAGE FEATURES

Dubois County lies within three drainage basins of the state (3). The northern part of the county is in the East Fork subdivision of the White River basin. The southeast and southwest corners are in the Minor Ohio basin. The remaineer of the county is in the Patoka River drainage basin.

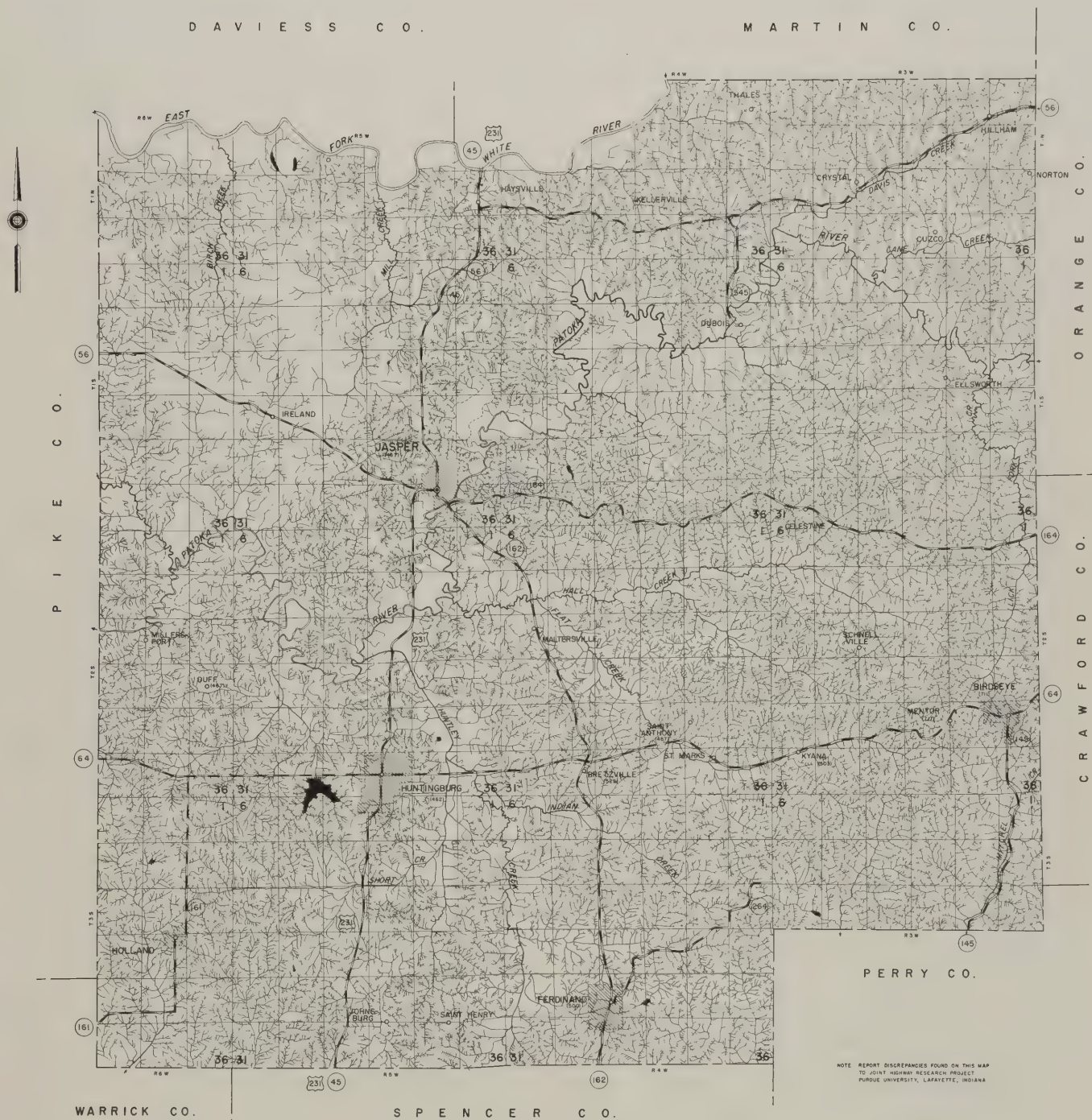
Surface drainage is well developed in the uplands of most of the county. Interstream areas in the northwestern part are relatively flat. Subsurface preglacial valleys exist in the northwestern part (9). The course of Patoka River seems to have been affected by glaciation (9). The Patoka River is a sluggish stream flowing through an aggraded valley. Its course has distinct angular bends in the western part of the county, indicating some rock control in that section. The White River valley acted as a glacial sluiceway. Drainage patterns are relatively fine-textured in all upland areas except in the vicinity of Ireland. Short, Hunley, and Lick Fork creeks appear to be influenced by the strike of the bedrock because of their rather definite northerly courses. Many streams have their sources in the county. Most streams in the northern part, draining into the East Fork White River, are small. Mill Creek and Birch Creek flow in a northerly direction to White River. Watershed divides exist in the northwestern, southeastern, and southwestern parts. The course of Flat Creek appears to have been affected by glaciation because of its deflection; it flows southeasterly in the county and joins Patoka River. Bottom lands of East Fork White River are identified by long curving intermittent drainageways. Streams crossing the Crawford Upland are meandering; they show the effect of rock control.

There are no glacial lakes in the county. Abandoned meanders have been mapped in the East Fork White River valley. Ponds of various origins are scattered throughout the area. Artificial lakes have been constructed.

Ditches have been constructed to improve drainage conditions, especially in the low-lying areas and nearly flat areas.

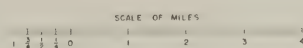
A stream gaging station is located on Patoka River at Jasper (12).

Note: The drainage map was prepared from 1937 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1953.



DRAINAGE MAP DUBOIS COUNTY INDIANA

PREPARED FROM
1937 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1953



ELKHART COUNTY

GENERAL NATURE OF THE COUNTY

Elkhart County is in the northern part of the state. Its area is approximately 468 square miles (1). Goshen, the county seat, is 130 miles north-northeast of Indianapolis.

Mean annual precipitation is 34.86 inches at Elkhart, and 32.23 inches at Goshen (2). An average annual snowfall of more than 40 inches can be expected.

The northwestern third of the county lies within the Kankakee Lacustrine section of the Northern Moraine and Lake physiographic region of the state (3). The remainder of the county is in the Steuben Morainial Lake section of this region. In respect to its physiographic situation in the United States the county is in the Eastern Lake section of the Central Lowland province (3).

The surface of the county is that of a glacial plain. It is broken by the valleys of the St. Joseph and Elkhart rivers and their tributaries. It varies from nearly flat to hilly. Maximum local relief is about 225 feet (3). The outwash plain north of the St. Joseph River contains numerous basins. Morainic areas are rolling; knob and basin topography exists in places. The terrain in the morainic portion of the northeast corner of the county is very rolling. Till plain areas are gently undulating. A depressed area exists northeast of Goshen. There are some high knolls southwest of Goshen. The outwash plain south of Elkhart slopes from south to north and to the west.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in origin. Bedrock in a small area in the southwest corner of the county is of Devonian age. In the remainder of the county it is of Mississippian age. There are no known outcrops of bedrock.

Elkhart County was glaciated. Surface drift is Wisconsin in age (3). The drift varies in thickness to more than 200 feet. This great difference in depth is due partially to preglacial bedrock topography. The New Paris moraine covers considerable area in the vicinities of New Paris and Foraker (10). The Topeka moraine begins near Goshen and extends intermittently in a southeasterly direction past Millersburg. The Middlebury moraine begins near Bristol and extends past Middlebury. The Lagrange moraine crosses the extreme northeast corner of the county. The New Paris moraine merges with a sandy plain on its northern end (10).

The soils of the county have developed from glacial materials, some of which have been reworked by wind and water (5). Upland area soils belong to the Miami catena. Fox, Warsaw, Coloma, and Oshtemo soils are found on the granular deposits. Alluvial soils belong to the Genesee catena. There are several rather large deposits of muck and peat in the county. In the uplands the subsoils are mostly permeable. Sandy or gravelly areas have very permeable subsoils (6).

Granular materials are widespread in their distribution in the county (7). They occur in outwash plains and in morainic knolls and ridges. A considerable portion of the county is occupied by gravel and

sand plains (7). A plain of granular materials borders the St. Joseph River. Areas producing sands and gravels are to be found in the northern, eastern, central, and southern parts (14).

Sand occurs east of Elkhart and along the Lagrange moraine in small dune areas. A sandy tract extends across the southeast part of the county.

DRAINAGE FEATURES

Only a very small portion of the southwest corner of Elkhart County lies in the Kankakee River drainage basin of the state (3). The remainder of the county is in the St. Joseph drainage basin, the central, southern, and southeastern parts of the county being in the Elkhart subdivision of this basin.

Natural drainage is best developed in the uplands. Absence of natural drainage development of the outwash plains is due to excellent internal drainage. A few small streams enter the St. Joseph River from the north. Noticeable is the direction of flow of the headwater streams of Turkey Creek. Baugo Creek is deflected. A glacial drainageway lies east of Goshen. Abandoned meanders occur in the Elkhart River valley. Haphazard drainage patterns mark morainic areas in the county. Local watershed divides occur near the crests of the moraines. Control of some streams and some stream deflections can be attributed at least partially, to the presence of moraines. Solomon Creek is a small stream having a wide valley. The rivers of the county originate outside the county.

There are several lakes in the county. Ponds of various origins are found in the various sections of the area. Gaging stations are located on Heaton, Hunter, Indiana, Simonton, and Wolf lakes (12). Some lakes are rather shallow.

Ditches have been dredged to improve sluggish drainage conditions in many sections of the area. Natural drainage of peat and muck areas has had to be supplemented by ditches.

Stream gaging stations are located on St. Joseph River at Elkhart; on Christiana Creek at Elkhart; and on Elkhart River at Goshen (12).

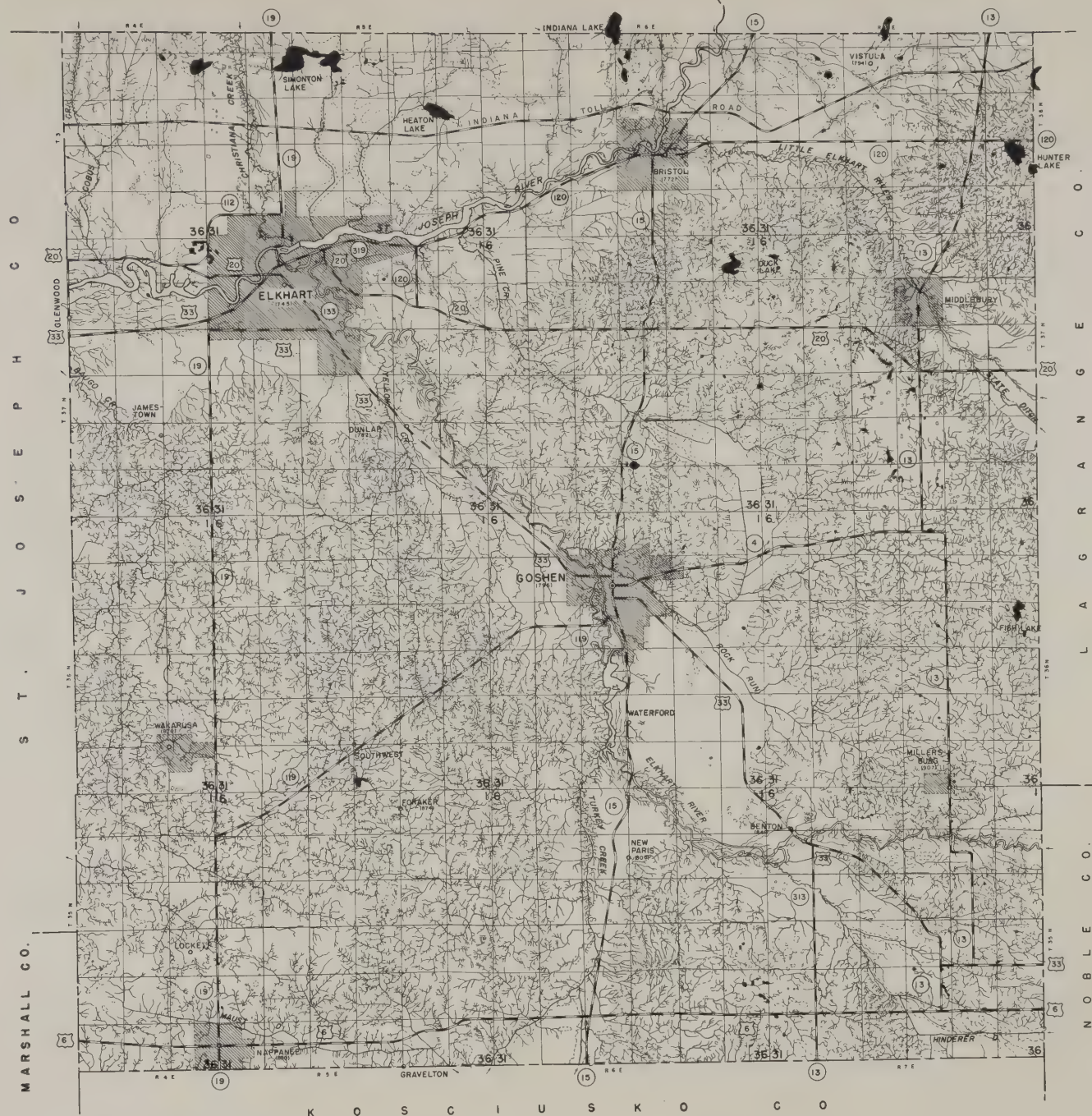
The St. Joseph River drains about 1,900 square miles of southern Michigan (3)(11).

Note: The drainage map was prepared from 1938 - 1939 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1950.

S T A T E O F M I C H I G A N

C A S S C O .

S T . J O S E P H C O .



NOTE. REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP
ELKHART COUNTY
INDIANA

PREPARED FROM
1939 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1950

SCALE OF MILES
1 2 3 4

FAYETTE COUNTY

GENERAL NATURE OF THE COUNTY

Fayette County is in the southeastern part of the state. Its area is approximately 215 square miles (1). Connersville, the county seat, is about 55 miles east-southeast of Indianapolis.

Mean annual precipitation is 37.96 inches at Connersville (2). An average annual snowfall of about 20 inches can be expected.

Most of Fayette County lies within the Dearborn Upland physiographic region of the state (3). Only a small area in the northwestern part is in the Muscatatuck Regional Slope. In respect to its physiographic situation in the United States it is in the Till Plains section of the Central Lowland province (3).

The surface of the county is that of a glacial plain conforming somewhat to irregularities of the underlying bedrock surface. The uplands adjacent to the valleys of West Fork Whitewater River and its tributaries have been roughened by dissection. The presence of morainic masses flanking both sides of the river valley has added to the difference in elevation in these areas. Maximum local relief is about 250 feet (3). The river valley in the vicinity of and northward from Connersville is fairly level and relatively wide; it narrows in the southern part. Interstream tracts in the uplands are gently rolling.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). The Quaternary materials are both Pleistocene and recent in age. Bedrock in the western third of the county is of Silurian age. In the remainder of the county it is of Ordovician age. The strata are comprised of limestones and shales. Rock outcrops occur in the stream beds. The western part of the county has several exposures of limestone.

Wisconsin glacial drift mantles most of the county (3). There are indications of exposures of Illinoian drift in the south-central part of the county (28). The thickness of the drift is 100 feet or more. A prong of the Shelbyville moraine extends nearly north and south on the west side of the West Fork Whitewater River; it has low relief (3). Along the east side of the river is a section of the Hartwell moraine (8).

Soils of the county have been developed from glacial materials (5). Some effect on them by the underlying bedrock has occurred along the valley walls of the major streams. Materials are water-worked in the river valley. Wisconsin drift soils in the uplands belong to the Miami and Russell catenas. Illinoian drift upland soils are of the Cincinnati catena. Fox, Abington, and Westland soils occur on the granular deposits. Alluvial soils are of the Genesee catena. Most upland subsoils are moderately to slowly permeable (6). In the south-central part, upland subsoils are slowly to very slowly permeable. River valley subsoils are permeable to very permeable.

Granular materials have been found along West Fork Whitewater River and its western tributaries. Valley wall and terrance deposits occur frequently (7). Areas producing sands and gravels are located in the central part.

DRAINAGE FEATURES

With the exception of the west-central and northwestern parts of Fayette County which lie within the East Fork subdivision of the White River drainage basin of the state, most of the county is in the White-water River drainage basin (3). Small portions along the eastern edge are in the East Fork Whitewater River subdivision.

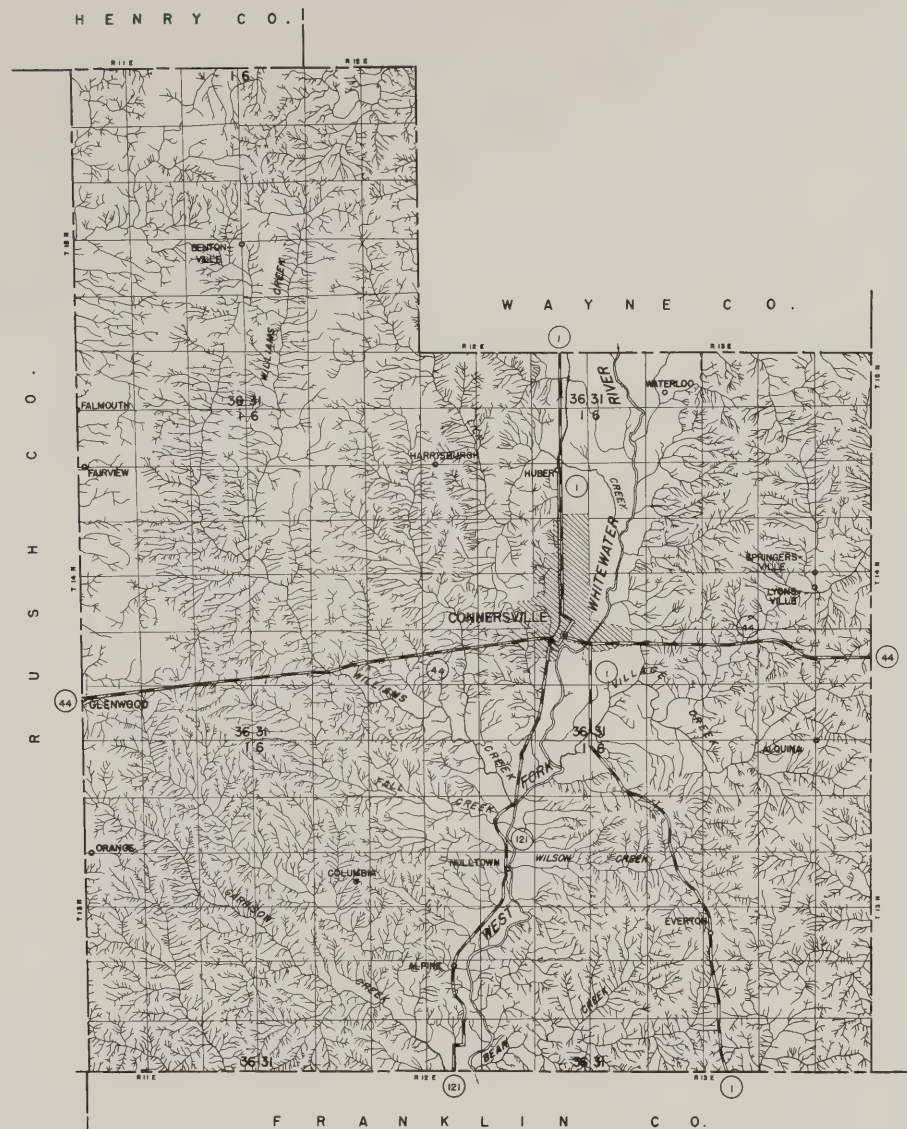
A remnant of the Whitewater Canal is in use north of Connersville. Surface drainage is best developed in the uplands adjacent the valleys of the main streams. The direction of flow of the West Fork Whitewater River may be in effect controlled by the Laughery escarpment (8). Streams flowing over rock exhibit minor deflections in alignment due to the various resistant and nonresistant strata. Village Creek has a distorted course; it appears to be the result of rock and terrace control. Absence of a developed drainage pattern on the terrace surface is due to excellent internal drainage. Watershed divides in the county are marked by crests of sections of moraines. These moraines, at least partially, have caused stream deflections and intensified the densities of the drainage patterns. Some control of stream courses, also, may have been affected by the moraines. Distinctive is the reversal in the course of Simon Creek. Tributaries of the West Fork Whitewater River cross morainic areas. North-south watershed divides occur in the eastern and western parts. Many tributaries of the West Fork Whitewater River originate within the county. The headwater streams of Williams Creek are deflected. Small areas in the southeast and southwest corners of the county drain into Franklin County through creeks that flow into West Fork Whitewater River.

There are no natural lakes in the county. Ponds of various origins are scattered over the area.

Ditches have been constructed where necessary to improve drainage conditions.

A stream gaging station is located on the West Fork Whitewater River at Alpine, above which the river drains about 496 square miles (12).

Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1947.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP FAYETTE COUNTY INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS.

BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY

1946

SCALE OF MILES



POLYCONIC PROJECTION

REDRAWN BY: M. DENNEY

FLOYD COUNTY

GENERAL NATURE OF THE COUNTY

Floyd County is located in the southern part of the state. Its area is approximately 149 square miles (1). New Albany, the county seat, is 115 miles south of Indianapolis.

From data collected in surrounding counties the mean annual precipitation should be slightly less than 43 inches (2). An average annual snowfall of not more than 20 inches can be expected.

Floyd County lies within three physiographic provinces of the state. Progressively from east to west they are: The Scottsburg Lowland, the Norman Upland, and the Mitchell Plain (3). In respect to its physiographic situation in the United States that portion east of the glacial boundary is in the Till Plains section of the Central Lowland province and the remainder of the county is in the Highland Rim Plateau section of the Interior Low Plateaus province (3).

The surface of the county varies from that of a glacial plain in the eastern part to a bold stream-dissected escarpment in the central part, to a limestone plain in the western part. The Knobstone escarpment is the most prominent feature. Maximum local relief is about 560 feet (3). The glaciated portion is broken by the valleys of Silver Creek and its tributaries. In general, this area has broad stream valleys and few steep slopes. The land slopes gently westward from the crest of the Knobstone escarpment. Terraces occur along the Ohio River. Differences in elevation along the Ohio River valley wall in the southern part are great. Sinkholes occur in the western part of the county, producing a slightly pitted terrain along some of the streams. Sharp-crested interstream divides are to be found in the Knobstone escarpment region; the perfection and symmetry of the drainage lines are notable features.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). The Quaternary materials are both glacial and recent in origin. Bedrock in the eastern part of the county is of Devonian age. In the remainder of the county it is of Mississippian age. The Devonian rocks are shales and Mississippian rocks are the Borden formation and limestones. Shale outcrops at New Albany and along the streams of the lowland north of the city. Sandstone and shale outcrop in the Knobstone escarpment. Limestone is exposed in the western part of the county.

Glacial drift covers the lowland in the eastern part of the county (3). The remainder of the county is in the driftless region of the state. The drift is Illinoian in age (28). It is rather thin. Its boundary is irregular along the serrated face of the Knobstone escarpment.

The soils of the county have been derived from glacial and residual materials (5). Soil parent materials in the Ohio Valley are water-worked. Soils in the eastern part have been developed from Illinoian glacial drift. They are of the Jennings catena. Limestone soils belong to the Hagers-town and Frederick catenas. Sandstone-shale soils belong to the Zanesville catena. Soils in the Ohio Valley are of the Wheeling catena. Alluvial soils are of the Huntington catena. Subsoils of moderate to slow permeability occur throughout most of the county (6). River valley lands have very permeable subsoils.

Granular materials occur in and along the Ohio River (7). Stream deposits consisting mostly of local bedrock fragments are found in other parts of the county. Areas producing sands and gravels are located along the Ohio River.

A deposit of sand is found in the uplands in the extreme north-west corner of the county (3). Lacustrine deposits are to be found along streams entering the Ohio River.

DRAINAGE FEATURES

Almost all Floyd County lies within the Minor Ohio drainage basin of the state (3). Only a very small area in the northwestern corner is in the Blue River basin; it, also, drains into the Ohio River.

Knobs and Middle creeks show deflections by Ohio River terraces. Streams coursing down the face of the Knobstone escarpment have high gradients; their valley cross-sections are V-shaped. Surface drainage systems are best developed in this escarpment region. The course of the Ohio River south of New Albany apparently is controlled by resistant rock strata. Frequently stream valleys in the western part are shallow in their upper reaches. Their channel gradients are relatively low. Drainage patterns are noticeably different in the eastern, central, and western parts. Silver Creek flows in the trough of the Scottsburg Lowland. It is meandering in its lower reaches. Streams flowing in the shale lowlands meander with little control; their valleys are shallow. The direction of flow of Silver Creek is in effect controlled by the Knobstone escarpment. Tributaries of Silver Creek in the county are short. A few short streams flow directly into the Ohio River. In the southern part the terraces separating the river from the valley wall are relatively narrow. Subterranean drainage may or may not contribute to the runoff of the streams crossing the immediate area. Drainage patterns are fine-textured in the dissected areas. The main watershed divide in the county is the crest of the Knobstone escarpment. This is clearly defined by the arrangement of the stream systems. Several small streams originate within the county.

There are no natural lakes in the county. Ponds of various origins are scattered throughout the area. A bayou exists along Silver Creek near its junction with the Ohio River.

Some ditches have been constructed, especially in the lowlands.

Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1947.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

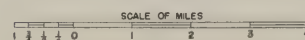
DRAINAGE MAP FLOYD COUNTY INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS

BY
STATE HIGHWAY COMMISSION OF INDIANA

AT
PURDUE UNIVERSITY

1947



POLYCONIC PROJECTION

FOUNTAIN COUNTY

GENERAL NATURE OF THE COUNTY

Fountain County is in the central -western part of the state. Its area is approximately 397 square miles (1). Covington, the county seat, is 75 miles west-northwest of Indianapolis.

Mean annual precipitation is 38.19 inches at Covington (2). An average annual snowfall of about 20 inches can be expected.

Fountain County lies wholly within the Tipton Till Plain physiographic region of the state (3). In respect to its physiographic situation in the United States it is in the Till Plains section of the Central Lowland province (3).

The surface of the county is that of a glacial plain broken by the valleys of the Wabash River and its tributaries. It is ridged by moraines. Maximum local relief is about 150 feet (3). Morainic topography is undulating in the western part. Morainic knolls are found in the northeastern part; these are rather prominent. The county slopes west and south. Numerous south flowing streams have dissected the southeastern part. The central part is a gently undulating plain. Local basins occur. The Wabash Valley acted as a glacial sluiceway. Its valley walls are dissected. Dissection exists along Sugar Mill Creek. A ridge of drift extends northward from Veedersburg. The north-central part has the appearance of a glacial sluiceway.

The surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in origin. In the eastern fourth of the county bedrock strata are of Mississippian age. In the remainder of the county they are of Pennsylvanian age. There are rock outcrops along the Wabash River and most of its tributaries. Sandstone and shale outcrop along Coal Creek. Shale is exposed at Veedersburg and Covington.

All Fountain County was glaciated. Surface drift materials are Wisconsin in age (3). The drift thickness varies according to the pre-glacial topography, being as much as 225 feet deep. Portions of two morainic systems have been recognized in the county (3). Ridges of the Champaign moraine are found in the southwestern and central parts. Sections of the Bloomington moraine cross the northeastern corner.

The soils of Fountain County are derived from glacial materials (5). Only in local areas has the bedrock influenced their formation. Soil-forming materials in the north-central part are considerably water-worked. Upland soils belong to the Carrington and Russell catenas. Fox and Warsaw soils occur on the granular deposits. Sandy and loessial soils are of the Princeton catena. Alluvial soils belong to the Genesee catena. Most of the uplands have subsoils which are moderately to slowly permeable (6). An area in the north central part has subsoils which are very permeable. River valley subsoils are very permeable.

Granular materials occur in the Wabash River terraces and in knolls of the moraines (7). Knolls of granular materials are found in the northeastern part. Areas which produce sand and gravel are located mostly in

the northern and western parts. Gravel has been found along Shawnee Creek, Wabash Mill Creek, Mill Creek and Sugar Mill Creek. Considerable gravel is found along Coal Creek in terrace-like deposits (9). Local outwash plains occur in the central part.

Sands occur in places along the Wabash River bluffs. Loess has been mapped as covering the western part (20).

DRAINAGE FEATURES

Fountain County lies wholly within the Wabash drainage basin of the state (3). The southeast corner is in the Sugar Creek subdivision of the basin.

The Wabash River forms the northern and western boundaries of the county. The river flows in a preglacial valley in the southern part. In the northeastern part it has formed a post glacial channel. Surface drainage is best developed in the uplands adjacent the Wabash River and its principal tributaries. Lack of surface drainage development on the terraces is due to excellent internal drainage. Streams are widely spaced in some upland areas in the central part. The courses of the natural drainageways have been interrupted by strip mining operations in the southern part of the county. Grahams Creek flows in a southerly direction, presumably controlled by the strike face of the bedrock and morainic topography. Coal Creek is relatively sluggish in the eastern part of the county. Near the center of the county it turns abruptly southward and becomes somewhat entrenched (9). It seems to have been affected by glaciation. Sugar Mill Creek is entrenched. Several stream valleys are ravine-like. The density of drainage patterns is intensified in sections of morainic areas in the county. The crests of these moraines have influenced watershed divide locations. Some stream course control and some stream deflection may be attributed, at least partially, to the moraines. Some watershed divides are broad and nearly level in the central part of the county.

There are no natural lakes in the county. Ponds of various origins are scattered throughout the area.

Ditches have been constructed where necessary. These are located in the nearly level parts of the county.

A stream gaging station is located on the Wabash River at Covington (12).

The drainage area of the Wabash River above Covington is about 8,430 square miles (11).

Note: The drainage map was prepared from 1939 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1946.



DRAINAGE MAP
FOUNTAIN COUNTY
INDIANA

PREPARED FROM
1939 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT

AT
PURDUE UNIVERSITY

SCALE OF MILES
1 2 3 4
1946

PREPARED UNDER THE SUPERVISION OF S. T. YANG
REVISED, MARCH 1950, BY P. T. YEA

POLYCONIC PROJECTION

FRANKLIN COUNTY

GENERAL NATURE OF THE COUNTY

Franklin County is located in the southeastern part of the state. Its area is approximately 394 square miles (1). Brookville, the county seat, is about 65 miles southeast of Indianapolis.

Mean annual precipitation is 39.11 inches at Brookville (2). An average snowfall of nearly 15 inches can be expected annually.

Most of Franklin County is in the Dearborn Upland physiographic province of the state. Only a small area in the extreme southwestern part is in the Muscatatuck Regional Slope. In respect to its physiographic situation in the United States it is in the Till Plains section of the Central Lowland province (3).

The surface of the county is that of a glaciated plain dissected by Whitewater River and its tributaries. It is ridged by sections of a moraine. Maximum local relief is about 300 feet (3). Near the river, the terrain has been slightly modified by wind action and dune topography exists in places. Relatively broad, nearly level areas occur in the southwestern part. In the northeastern part, the surface is gently undulating. Terrace topography is generally nearly flat.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both glacial and recent in origin. Bedrock in the extreme western part of the county is of Silurian age. In the remainder of the county it is of Ordovician age. The strata are composed of limestones and shales. Rock outcrops in the beds and valley walls of many streams in the area. Limestone has been quarried at Laurel.

All Franklin County was glaciated. The glacial drift in the southwestern half is Illinoian in age, and in the northeastern half it is of Wisconsin age (3)(28). The drift material is 150 feet or more in thickness in some places. Much of the drift has been eroded from the steep slopes along the major streams. The drift border is indistinct in some areas due to dissection along the river valley. The Shelbyville moraine extends across a small part of the northwest corner of the county. The Hartwell moraine crosses in a belt from near the center of the north county line to near the center of the east county line.

The soils of the uplands have been developed from Illinoian and Wisconsin glacial drift and from the bedrock (5)(39). Materials in the river valleys and in some of the tributary stream valleys are water-worked. In the northeastern part the soils belong to the Russell catena. In the southwestern part the soils belong to the Cincinnati catena. Limestone-shale soils belong to the Switzerland catena. Fox soils are found on the granular deposits. Alluvial soils are of the Genesee catena. The subsoils in the northeastern part are moderately to slowly permeable (6). Upland area subsoils in the remainder of the county are slowly to very slowly permeable. River valley subsoils are mostly permeable. The texture of surface soils is generally silty, with the range through sands, silts and clays.

Numerous granular terraces are found in the valley of the Whitewater River and its two forks (7). Areas producing sand and gravel are located in the central part of the county. Some knolls of granular material are found north of Brookville. Silt terraces exist in some of the stream valleys in the Illinoian drift covered portion (8). Wind-

deposited sands occur in small isolated areas along the bluffs of the Whitewater River southeast of Brookville and on the terraces of West Fork Whitewater River near Laurel (8).

DRAINAGE FEATURES

Franklin County lies within three drainage basins of the state. Most of the county is in the Whitewater drainage basin (3). The southwestern corner and a small area in the south-central part is in the Minor Ohio basin. The northeastern part drains into Ohio and is in the Miami basin.

The general trend of the drainage is to the southeast. The Whitewater River and its two forks are deeply entrenched. Likewise, the valleys of their tributaries are deep at their junctions with the main valleys. Drainage is best developed along the valleys of the principal streams. Much of the county is well drained. In the northeastern corner drainage is in a northerly direction. A section of the old Whitewater Canal has been retained in the vicinity of Metamora. Lack of surface drainage development on the granular stream terraces is due to good internal drainage. Many streams flow on rock in portions of their courses. Streams flowing in rock show minor deflections where the water flows over alternating resistant and nonresistant strata. Some upland areas have widely-spaced streams; these are found in the eastern and southwestern parts. The density of the drainage patterns is intensified in the morainic areas of the county. Local watershed divides occur near the crests of the moraines. Minor waterfalls exist in some stream channels. East Fork Whitewater River and some of its tributaries cross a morainic area. The West Fork Whitewater River is deflected to the southeast and this deflection may in effect be controlled by the Laughery escarpment. A watershed divide exists in the central-eastern part of the county. Salt Creek has become a northeasterly flowing stream. Nearly all major tributaries exhibit deflections near their junctions with the rivers, probably due to the terraces. In the central-southern and southwestern parts, low gradient streams extend for long distances into the gently sloping uplands.

There are no natural lakes in Franklin County. Ponds of various origins are scattered over the area.

Ditches have been constructed and streams straightened to improve drainage conditions in the nearly level sections. In the southwestern part natural drainage in some cases is impeded; drainage is effected by shallow surface ditches in the more nearly level areas of this section.

A stream gaging station is located on the Whitewater River at Brookville (12). The drainage area of the two forks of Whitewater River above Brookville is about 1,190 square miles (12).

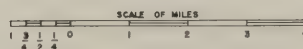
Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1947.



DRAINAGE MAP FRANKLIN COUNTY INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
STATE HIGHWAY COMMISSION OF INDIANA
AT
PURDUE UNIVERSITY

1947



POLYCONIC PROJECTION

FULTON COUNTY

GENERAL NATURE OF THE COUNTY

Fulton County is located in the north-central part of the state. Its area is approximately 367 square miles (1). Rochester, the county seat, is 90 miles north-northeast of Indianapolis.

Mean annual precipitation is 35.88 inches at Rochester (2). An average annual snowfall of about 30 inches can be expected.

The central, western and northwestern parts of Fulton County are in the Kankakee Lacustrine section and the remainder of the county is in the Steuben Morainal Lake section of the Northern Moraine and Lake physiographic region of the state (3). In respect to its physiographic situation in the United States it is in the Eastern Lake section of the Central Lowland province (3).

The surface of the county is that of a glaciated plain. It is broken by the valleys of the stream systems and ridged by moraines. It has been modified by wind and water action. Maximum local relief is about 80 feet (3). An extensive sandy plain extends over the central and northwestern parts. Sand dunes and sand ridges are superimposed on the sand plain in the western part. Underlying materials influence features of the sand plain, especially where the sand is thin on drift. Lake basins are conspicuous in the southeastern part of the county. Local depressed areas occur in nearly all parts of the county. Morainic topography is uneven and prominent. Intermorainic areas in the southeastern part are slightly rolling.

The surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock in the southern third of the county is of Devonian age. In the remainder of the county it is of Silurian age. There are no known outcrops of rock in the county.

All Fulton County was glaciated (3). Surface drift is Wisconsin in age. The thickness of the drift is as much as 300 feet in places (4). It varies in thickness according to pre-glacial topography. There are sections of three moraines in the county (3). One portion of the Maxinkuckee moraine nearly parallels the western border and another portion is found north of the Tippecanoe River. The Packerton moraine crosses the southeast corner. The Rochester moraine extends southeasterly from Rochester to the Packerton moraine. Its surface is less irregular than the other two moraines.

The soils of the county have been derived from glacial, fluvial, and aeolian materials (5). Upland soils belong to the Miami and Galena catenas. Fox soils are found on the granular deposits. Plainfield soils are sandy, alluvial soils are of the Genesee catena. Depressed areas contain soils of high organic content. Maumee soils occur in depressions. Muck and peat deposits are found in such areas. Permeable subsoils are found in most of the county (6). Sandy and gravelly areas have very permeable subsoils.

Some granular material has been found in various parts of the county (7). The materials are exposed along streams and ditches. Areas producing sand and gravel are located in the northwestern, east-central, southeastern and southwestern parts. Extensive areas of semi-granular drift are found in the eastern part.

The western half of the county is covered with sand (8). Sand deposits almost obliterate the morainic features in this part. A sand plain separates Mud Creek from the Tippecanoe River. There is a narrow sandy tract along the Tippecanoe River southwest of Rochester. Sand dunes and ridges are prominent in certain parts.

DRAINAGE FEATURES

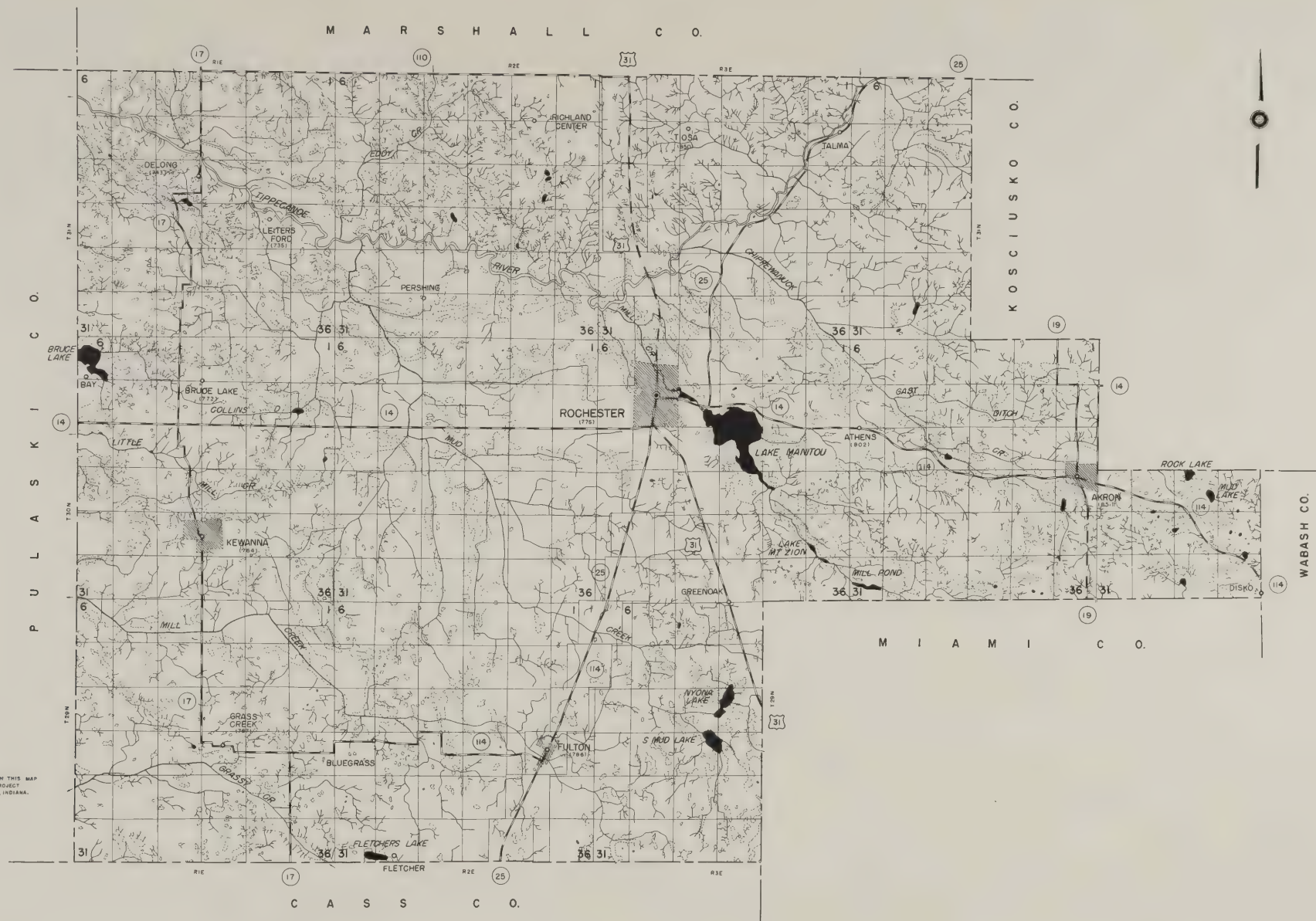
Most of Fulton County lies within the Tippecanoe subdivision of the Wabash drainage basin (3). Small areas in the southeast corner are in the Eel subdivision of the Wabash basin.

The Tippecanoe River has a low gradient. Natural surface drainage is best developed along the Tippecanoe River in the north-eastern part. On the whole, natural drainage is weakly developed. Internal drainage is excellent in the outwash plains. The upper valley of Mud Creek is low lying topographically. The density of drainage patterns has been somewhat intensified by the presence of sections of moraines in the county. Locations of local drainage divides have been influenced by the crests of these moraines. Some stream courses appear to have been controlled by the moraines. The Tippecanoe River crosses a morainic area. Streams south of the river have a north-westerly trend. In the northeastern part, north of the river, part of the streams flow in an easterly direction. Drainage in peat and muck areas is effected artificially. Many watershed divides are broad and nearly level. The Tippecanoe River valley has several filled abandoned meanders.

There are a number of lakes in Fulton County. Many of them lie in the eastern part. Ponds of various origins are scattered over the area. Some of the lakes lie in narrow deep absins between morainal hills. The lakes tend to stabilize the flow of their outlet streams. Gaging stations are located on Fletcher, Manitou, Nyona and South Mud lakes (12).

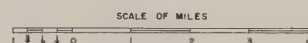
Ditches have been constructed to improve drainage conditions in low-lying areas. Many streams have been dredged.

Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1955.



DRAINAGE MAP FULTON COUNTY INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1955



GIBSON COUNTY

GENERAL NATURE OF THE COUNTY

Gibson County is located in the southwestern part of the state. Its area is approximately 499 square miles (1). Princeton, the county seat, is about 105 miles southwest of Indianapolis.

Mean annual precipitation is 41.62 inches at Princeton, 40.81 inches at Hazelton, and 40.60 inches at Johnson (2). An average annual snowfall of about 15 inches can be expected.

Gibson County lies wholly within the Wabash Lowland physiographic region of the state (3). In respect to its physiographic situation in the United States, the southeastern third of the county is in the Interior Low Plateaus province, and the remainder of the county is in the Till Plains section of the Central Lowland province (3).

The surface of Gibson County varies from nearly level in the western part to rolling in the central and eastern parts where streams have dissected the uplands. Maximum local relief is about 250 feet (3). The western two-thirds of the county consists of a high glaciated plain and of low river valleys. Extensive flood plains occur along the Wabash River. There are a few steep bluffs which have been produced by local undercutting of the valley walls of some of the streams. The surfaces of the lakebed are nearly level. The upland between the White and Patoka river valleys is rolling. Morainic features are subdued or actually lacking. Alluvial fans are noticeable along the east valley wall in the Wabash lowlands. Dune topography exists in the sand areas.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock strata are of Pennsylvanian age. Outcropping rocks include sandstones, shales, limestones and coals. These outcrop in various places in the central and eastern parts of the county. About three-fourths of Gibson County was glaciated, the southeastern part being in the unglaciated region of the state (3). Surface drift is Illinoian in age. In general the thickness of the drift is relatively thin near the drift border; the drift has been eroded in many places. The drift is thickest in the lowlands and in filled preglacial valleys. Three morainic areas of Illinoian glacial age lie south and southwest of Princeton (9). One of these, a rather conspicuous ridge, lies east of Fort Branch. Some low knolls are found along the border in the northeastern part of the county, producing the only expression of a moraine in this area.

The soils of the county have been developed from glacial, residual limestone-sandstone-shale, aeolian, and alluvial materials (5). Sandstone soils belong to the Zanesville catena. Loessial soils belong to the Alford catena. Alluvial soils belong to the Genesee, Staser, and Pope catenas. Muck and peat have been mapped in limited areas in the southwestern part.

Upland subsoils in the eastern part of the county are moderately to slowly permeable (6). Loessial and sandy area subsoils are mostly permeable. Lakebed subsoils are slowly permeable. River valley subsoils are mostly permeable.

Terraces of granular materials occur in the Wabash Valley. Some gravel has been obtained from bars in White River (7). Areas producing sands and gravels are located mostly in the western part of the county. Some sand and gravel have been found along the drift border. Cherty gravels are found on top of the hills in the central part of the county (27). Deposits of local bedrock fragments are found in some of the stream valleys.

Uplands in the south-central, central, and northeastern parts have been mapped as being covered with deep loess (20).

Extensive sand areas are near Johnson, Princeton, and Patoka.

Lacustrine deposits occur along streams entering the Wabash River (17). Pigeon Creek drains a glacial lakebed.

DRAINAGE FEATURES

Gibson County lies within three drainage basins of the state. Progressively from north to south they are: The White, the Patoka, and the Minor Ohio. Even though the southwestern part of the county drains into the Wabash River it has been included in the Minor Ohio basin (3).

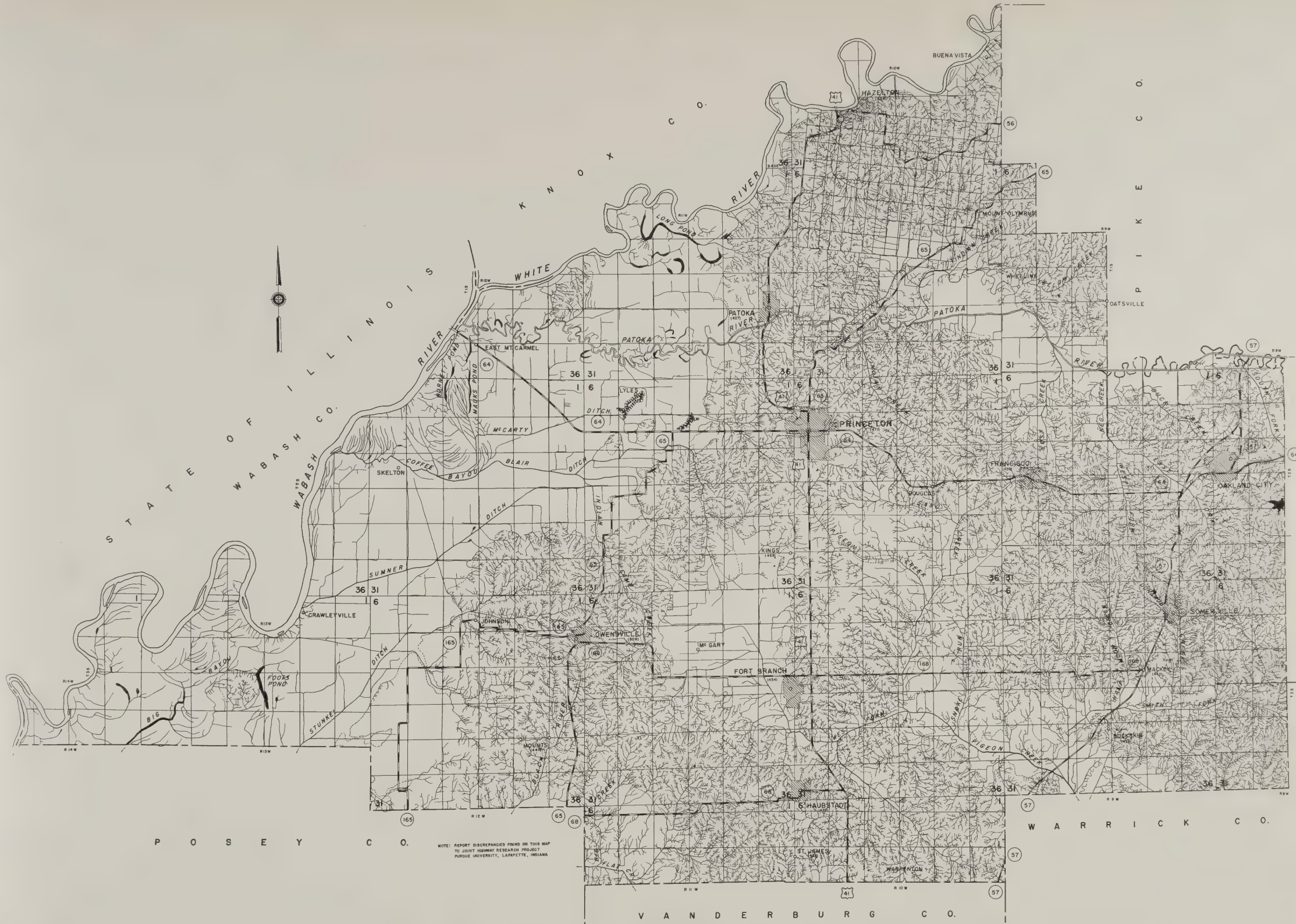
Small streams in the valley walls of the Wabash and White Rivers have cut sharp, V-shaped gullies. Many upland streams flow through broad, shallow valleys. The Patoka River is the largest tributary of the Wabash River south of the mouth of White River. It has a long, narrow basin. It has a very narrow valley at Patoka. A buried preglacial valley extends across the southwestern part (9). The Wabash and White river valleys acted as glacial sluiceways (22). White River flows close to the valley wall near Hazelton. Portions of the abandoned Wabash and Erie Canal can be traced through the Sand and Pigeon creek valleys. Natural drainage has developed best in the upland areas. The sand dune areas, especially in the vicinity of Johnson, exhibit a lack of developed surface drainage. The Wabash and White Rivers meander in wide, deeply alluviated valleys. Numerous oxbows have resulted from this meandering. Their valleys are preglacial. Drainage patterns are rather fine-textured in the uplands. Ditches create a rectilinear pattern in the bottom lands. Very short streams enter the White River in the northern part. There are only slight differences in the drainage patterns of the glaciated and unglaciated uplands. In the southwest corner the sharp bend in Big Creek is noticeable; it is apparently the effect of glaciation. The watershed divide of Pigeon Creek separates Ohio River drainage from Wabash River drainage. The deflected courses of Black River, Big Creek, and Pigeon Creek are probably the result of glaciation (9). Bottom lands are marked with filled-in abandoned meanders and long, curving, intermittent drainageways which act as floodwater flumes. Surface drainage in the alluvial areas is effected artificially. Erosion on the sand dunes is reduced to a minimum.

Lakes consist of bayous, or abandoned meanders in the river valleys. Ponds of various origins are scattered over the area.

Ditches have been constructed to improve drainage in the glacial lakebeds and in the river bottomlands. Patoka River and other streams have been dredged.

Stream gaging stations are located on White River at Hazelton and on Patoka River near Princeton (12). The drainage area of the Wabash River above E. Mt. Carmel is about 28,810 square miles; this includes considerable area in Illinois (11). The drainage area of White River is about 11,290 square miles; that of East Fork White River, about 5680 square miles; and that of Patoka River about 850 square miles (11)(12).

Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1953.



DRAINAGE MAP GIBSON COUNTY INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1953

GRANT COUNTY

GENERAL NATURE OF THE COUNTY

Grant County is located in the north-central part of the state. Its area is approximately 421 square miles (1). Marion, the county seat, is 65 miles northeast of Indianapolis.

Mean annual precipitation is 37.10 inches at Marion (2). An average annual snowfall of more than 25 inches can be expected.

Grant County lies wholly within the Tipton Till Plain physiographic region of the state (3). In respect to its physiographic situation in the United States it is in the Till Plains section of the Central Lowland Province (3).

The surface of the county is that of a glacial plain broken by the principal streams and their tributaries. It varies from undulating to rolling. It is ridged by moraines. Dissection is greatest along the stream valleys. Maximum local relief is about 65 feet (3). Morainic areas are undulating, having low knolls. Intermorainic areas are gently rolling to nearly level. Depressed areas exist between Fairmount and Fowlerton. An abandoned channel extends southward from the southern part of the county into Shelby County.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both glacial and recent in origin. Bedrock strata are of Silurian age. There are outcrops of rock along the Mississinewa River and Pipe Creek (30).

All Grant County was glaciated. Surface drift is Wisconsin in age (4). The drift thickness was found to be more than 400 feet in places. It is deepest in the buried valley of the preglacial Teays River. Grant County is crossed by portions of two morainic systems (3). The Mississinewa moraine crosses the northeast corner in a northwest-southeast direction. The Union City moraine crosses the southwest corner in a northwest-southeast direction; its features approach those of undulating ground moraine.

The soils of the county have developed from glacial materials (5). Upland soils belong to the St. Clair and Miami catenas. Alluvial soils are of the Genesee catena. Fox soils have formed on the river terraces. Most of the areas marked as depressions on the map contain soils of high organic content (e.g., Clyde Soils); many contain muck and/or peat. Large deposits of muck are found east of Fairmount and southeast of Upland. In the northeastern third of the county the subsoils vary from slowly permeable to very slowly permeable (6). In the remainder the subsoils are moderately to slowly permeable.

Granular materials are found in stream terraces and in some morainic areas (7). Preglacial valleys contain granular deposits. Areas producing sands and gravels are found near the center of the county.

Wind blown sands are limited in extent, one area being a short distance south of Marion.

DRAINAGE FEATURES

Grant County lies wholly within the Wabash drainage basin of the state. The northeastern corner is in the Salamonie subdivision; the central part is in the Mississinewa subdivision; the west-central part is in the Pipe Creek subdivision; and the southwestern corner is in the Wildcat subdivision.

Natural drainage systems are most fully developed in the uplands immediately east of and adjacent to the Mississinewa River. The angular bends of Pipe Creek appear to be controlled by the underlying bedrock. The presence of sections of moraines has influenced stream systems to a certain extent. The locations of watershed divides, the intensified densities of drainage patterns, and the deflections of streams have resulted, at least partially, from the presence of the moraines. The course of the Mississinewa River appears to have been controlled by the Mississinewa moraine (8). Tributaries of the Mississinewa River cross morainic areas. Grassy Fork flows through a morainic area, also. Headwater stream courses appear distorted. Headwater streams of Black Creek seem to be controlled by morainic topography. Barren Creek flows through a depressed area which appears to be a filled glacial valley.

There is one natural lake in the county. Ponds of various origins exist in the several sections of the area.

The Mississinewa River has a shallow valley in the eastern part of the county. In the northern part the stream is somewhat entrenched. Its location is more or less controlled by the moraine. Streams are widely spaced in the western half of the county.

Ditches have been constructed to improve drainage conditions in certain areas. Many streams have been widened, straightened, and deepened by dredging.

A stream gaging station is located on the Mississinewa River at Marion (12). The drainage area of the Mississinewa above Marion is about 740 square miles (12).

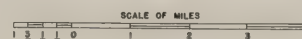
Note: The drainage map was prepared from 1941 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1948.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP GRANT COUNTY INDIANA

PREPARED FROM
1941 AAA AERIAL PHOTOGRAPHS
BY
STATE HIGHWAY COMMISSION OF INDIANA
AT
PURDUE UNIVERSITY
1948



POLYCONIC PROJECTION

GREENE COUNTY

GENERAL NATURE OF THE COUNTY

Greene County is located in the southwestern part of the state. Its area is approximately 549 square miles (1). Bloomfield, the county seat, is 70 miles southwest of Indianapolis.

Mean annual precipitation is 40.51 inches at Elliston (2). An average annual snowfall of about 20 inches can be expected.

The eastern half of Greene County lies within the Crawford Upland physiographic region of the state, and the western half is in the Wabash Lowland (3). In respect to its physiographic situation in the United States, the eastern third is in the Interior Low Plateau province, and the remainder is in the Till Plains section of the Central Lowland province (3).

The surface of the county varies from nearly level alluvial lands to rolling uplands. It is partly a glaciated plain and partly a residual upland dissected by White River and its tributaries. Maximum local relief is about 300 feet (3). Upland areas are dissected. The White River valley varies in width from a mile to several miles. The western half of the county is gently rolling. Some divides here are low and nearly level. The eastern half is rough and broken. The valleys of Richland and Plummer creeks are fairly narrow although wide in places. White River divides the county into two nearly equal parts. Near White River the terrain of the sand areas consists of small mounds and low ridges. Depressions are irregular in size and outline; some are entirely closed. White River valley contains abandoned channels. There are a few sink-holes in the southeastern part of the county. The Lattas Creek, Buck Creek, and Black Creek valleys may have been preglacial; they are wide and nearly level. A low, nearly level area lies west of Worthington.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock strata belong to the Mississippian and Pennsylvanian ages. Shales, limestones, and sandstones outcrop in the eastern part of the county. Coal is found in various places throughout the county, especially in the western part.

The western two-thirds of the county was glaciated (3). Glacial drift is Illinoian in age. The drift is rather thin near the drift border. The drift is thickest in the lowlands, and preglacial valleys have been filled to a considerable depth. Moraines either do not exist or are so subdued as to be inconspicuous.

The soils have been developed from glacial and residual materials. Some have been reworked by wind and water (5). Surface soils are silty, generally. Illinoian drift soils belong to the Cincinnati catena. Sandstone soils belong to the Zanesville catena. Limestone soils belong to the Frederick and Hagerstown catenas. Fox soils are found on the granular deposits. Alluvial soils belong to the Genesee and Pope catenas. In most of the county the subsoils are slowly to very slowly permeable (6). River valley subsoils are mostly permeable. Small areas in the south-central part have permeable subsoils.

Gravel bars are found along White River, particularly near Elliston (7). Stream valley deposits of local bedrock fragments occur in places. Some gravel is found north of Plummer Creek. Some outwash materials occur along Clifty Creek. Some sand occurs east of the White River valley. Sand occurs north of Plummer Creek. Deep loess has been mapped as covering the uplands in the southwestern corner of the county (20). Lacustrine areas such as the American Bottoms, exist east of the glacial boundary (3). There are a number of lakebeds and filled valleys in the western half of the county (3).

DRAINAGE FEATURES

Most of Greene County lies within the White River drainage basin of the state (3). A small area in the northwestern part of the county is in the Wabash drainage basin. Subdivisions of the White basin in the county are, progressively from northwest to southeast: the Eel, the East Fork and the White River basin proper.

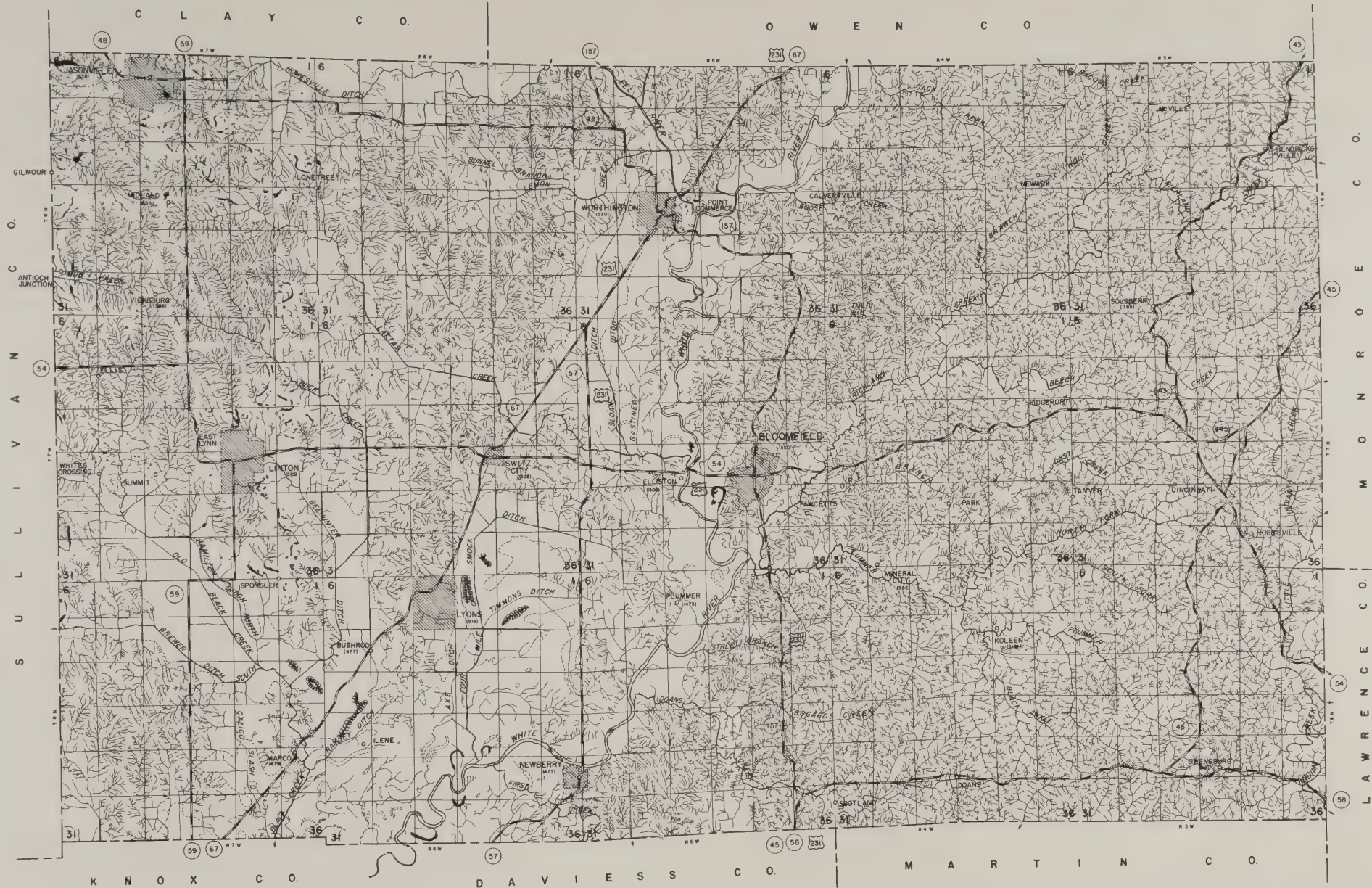
White River and Eel River valleys acted as glacial sluiceways. Many of the streams west of White River have alluviated valleys that are in some instances quite wide. Drainage patterns in the nonglaciated uplands are somewhat finer-textured than those in the glaciated uplands. Natural drainage is best developed in the uplands adjacent the main streams. Drainage in the residual areas is integrated in several sections. North of Park is a broad glacial col (3). Indian Creek shows the effects of rock control by its meandering north-south course. The headwater streams of Buck Creek (Four Mile Ditch) curve from north to south through an alluviated valley. Subterranean drainage may or may not contribute to the immediate runoff of the streams crossing the area. North of Worthington Eel River has been deflected through a gap in a group of hills (9). Richland Creek has been deflected southward in its course. The course of the natural drainageways have been interrupted in the western part of the county by strip mining operations. Richland and Plummers creeks are meandering due to the control of the underlying rock.

There are no glacial lakes in the county. Bayous have been formed by abandoned meanders in the White River valley. Ponds of various origins are scattered over the area.

Ditches have been constructed to improve drainage conditions. Streams have been dredged especially in the alluvial areas.

Stream gaging stations are located on White River near Worthington, at Elliston, and at Newberry; also, on Eel River near Worthington (12). Eel River has a drainage area of about 1,220 square miles (11).

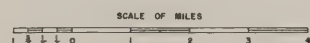
Note: The drainage map was prepared from 1937 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1953.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP GREENE COUNTY INDIANA

PREPARED FROM
1937 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1953



HAMILTON COUNTY

GENERAL NATURE OF THE COUNTY

Hamilton County is located in the north-central part of the state. Its area is approximately 403 square miles (1). Noblesville, the county seat, is 20 miles northeast of Indianapolis.

Mean annual precipitation is 38.23 inches at Noblesville (2). An average annual snowfall of from 20 to 25 inches can be expected.

Hamilton County lies wholly within the Tipton Till Plain physiographic region of the state (3). In respect to its physiographic situation in the United States, it is in the Till Plains section of the Central Lowland province (3).

The surface of the county is that of a glacial plain broken by the valleys of White River and its tributaries. It is ridged by a portion of a morainic system. Maximum local relief is about 85 feet (3). The area between Stoney Creek and White River is rolling. Some undulating terrain exists in the western part. There are knolls of some prominence in the vicinity of Sheridan, east of Horton, and southeastward from Westfield to the White River. The western part of the county is more rolling than the remainder, but generally the surface is nearly plane. In the eastern part of the county there is a gently undulating tract south of White River.

The surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in origin. Bedrock in the northeastern part of the county is of Silurian age. In the southwestern part it is of Devonian age. Limestone is exposed in a few places, including the Noblesville and Fishersburg vicinities. Sandstone outcrops along Stoney Creek and in the bed of White River near Strawtown.

All Hamilton County was glaciated (3). The surface drift is of Wisconsin age. The drift thickness varies from a few feet to as much as 300 feet. It is deepest presumably in the subsurface preglacial river valleys. It is relatively deep in the morainic sections, and glacial materials are of considerable depth in the White River Valley. A section of the Bloomington moraine describes a wide arc from the northwestern corner to near the center of the south county line (3).

The soils of Hamilton County have been developed from materials of glacial and fluvial origin (5). The soils of the morainic and till plain areas belong to the Miami catena. Clyde and Westland soils are found in the depressions. Bottom land soils are of the Genesee catena. Fox soils occur on the granular deposits. Depressions may contain soils of high organic content. The subsoils of the uplands of the county vary from moderately to slowly permeable (6). River valley subsoils are very permeable.

Granular materials are found in stream terraces and valley walls (7). They also occur in old filled valleys and in knolls and ridges (10).

Areas producing sand and gravel are located along White River. They are also found in the southwestern, central, and northwestern parts of the county. Subsurface deposits of granular materials occur in places.

DRAINAGE FEATURES

Hamilton County lies wholly within the White River drainage basin of the state (3).

Surface drainage is best developed along the valleys of White River and the other principal streams. The White River valley south of Noblesville acted as a glacial sluiceway. The remarkably curved course of Little Cicero Creek is probably due to a section of the Bloomington moraine. The location of watershed divides and intensified density of drainage patterns are influenced, to a certain extent, by the presence of the moraine in the area it covers. Some stream control may be attributed, also, to the moraine. Sugar Run flows southeasterly and Hinkle Creek has a curving course. Channels of glacial meltwater drainage are conspicuous in the southeastern quarter of the county. Some of the channels have been drained in two directions. The watershed divide across the northwestern corner is probably due to the Bloomington moraine. Grassy and Sandy creeks are nearly parallel to each other and to Fall Creek. White River is somewhat entrenched below the general till plain -- its valley walls of drift are conspicuous. Duck Creek is deflected near White River. Noticeable, also, is the deflected course of Lick Creek near Deming. Fall Creek formerly had some unusual curves in the southeast corner of the county. Prairie Creek drains in a northeasterly direction to Cicero Creek in Tipton County. White River is deflected.

There are no natural lakes in the county. Reservoirs have been constructed in the central and southeastern parts. Ponds of various origins are scattered throughout the area. Geist reservoir is shown on the map, but Morse reservoir on Cicero Creek is not shown.

Portions of the county are drained by ditches. Some of the streams have been dredged and straightened.

Stream gaging stations are located on White River at and near Noblesville, and on Cicero Creek near Cicero (12).

The drainage area of White River above Noblesville is about 913 square miles (11).

Note: The drainage map was prepared from 1941 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1954.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP HAMILTON COUNTY INDIANA

PREPARED FROM
1941 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1954



HANCOCK COUNTY

GENERAL NATURE OF THE COUNTY

Hancock County is located in the central part of the state. Its area is approximately 305 square miles (1). Greenfield, the county seat, is 20 miles east of Indianapolis.

Mean annual precipitation is 38.78 inches at Greenfield (2). An average annual snowfall of more than 20 inches can be expected.

Hancock County lies wholly within the Tipton Till Plain physiographic region of the state (3). In respect to its physiographic situation in the United States, it is in the Till Plains section of the Central Lowland province (3).

The surface of the county is nearly level to gently rolling. Near the major drainageways it becomes somewhat hilly. It is a glacial plain broken by the valleys of the Big Blue River, Sugar Creek, and other major streams. Maximum local relief is about 70 feet (3). Dissection is greatest near the main streams. This is noticeable along Fall Creek, Sugar Creek, and Blue River. Certain portions of the morainic areas have a subdued kettle-kame topography; usually morainic features are not pronounced. Interstream areas are gently rolling; some basins exist in certain areas. Occasional ridges and small mounds are prominent; a ridge lies along the west side of Six Mile Creek. Some till plain areas have shallow basins. Long, shallow depressions extend from north to south through the central part of the county; these apparently acted as sluiceways for glacial melt waters. In some cases they are crossed by present day streams. The southern part contains a broad undulating tract.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock in the northeastern third of the county consists of strata of Silurian age. In the remainder of the county it is of Devonian age. There is no record of rock exposures.

All Hancock County was glaciated (3). Surface drift is Wisconsin in age. The thickness of the drift is as much as 250 feet in places. It is thickest in the subsurface preglacial river valleys. Two substages of the Bloomington moraine cross the county (10). One section of the moraine traverses the southeast corner while the other extends from the northeast corner, through the central portion to the southwestern corner.

Most of the soils have been derived from glacial and alluvial materials (5). Upland soils belong to the Miami catena. Fox soils occur on the stream terraces and Abington soils have developed in the old, abandoned channels. Alluvial soils are of the Genesee catena. Clyde and Westland soils occur in the depressions. Muck has been found in

the central-western part and in the central and north-central parts. Upland subsoils are moderately permeable in sloping areas and slowly permeable in depressions and nearly level sections (6). River valley subsoils are mostly permeable.

Some of the glacial sluiceways contain granular materials (7). Deposits occur in the terraces and valley walls of the major streams. Scattered knolls of granular materials occur in the central-northern part. Areas producing sands and gravels are located in a north-south band through the central part of the county.

DRAINAGE FEATURES

Hancock County lies within the White River drainage basin of the state (3). The northwest corner is in the White River basin proper and the remainder of the county is in the East Fork subdivision of this basin.

Many stream valleys are broad and shallow. Many streams have low gradients. Big Blue River is somewhat entrenched. Surface drainage is best developed along this and other principal streams of the county. For the most part drainage is toward the south and southwest, except in the northeast where it is westerly. Streams draining the glacial sluiceways are disproportionately small, and in some cases insignificant. Some of the channels are drained in two directions. Most streams have few tributaries. Flat Fork drains northwesterly into Fall Creek. Stream systems have been influenced by the presence of sections of moraines in the county. The locations of local drainage divides and stream deflections are probably due to the moraine. Six Mile Creek is deflected near Big Blue River. Noticeable are the abrupt changes in direction of the courses of Sugar and Brandywine creeks in the northern part of the county. A watershed divide exists across the northwest corner of the county. Streams in the northwestern corner have a westerly trend.

There are no natural lakes in the county. Ponds of various origins are scattered over the area.

Ditches have been constructed to improve drainage conditions in low-lying areas. Streams have been dredged.

Note: The drainage map was prepared from 1939 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1948.

H A M I L T O N C O .

M A D I S O N C O .

M A R I O N C O .

H E N R Y C O .

R U S H C O .

S H E L B Y C O .

NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP
HANCOCK COUNTY
INDIANA

PREPARED FROM
1939 AAA AERIAL PHOTOGRAPHS
BY
STATE HIGHWAY COMMISSION OF INDIANA
AT
PURDUE UNIVERSITY
1948



POLYCONIC PROJECTION

HARRISON COUNTY

GENERAL NATURE OF THE COUNTY

Harrison County is located in the southern part of the state. It has an area of approximately 470 square miles (1). Corydon, its county seat, is 110 miles south of Indianapolis.

The mean annual precipitation is 42.71 inches at Evans Landing, and 42.94 inches at Laconia (2). Average annual snowfall is not expected to be more than 15 to 20 inches.

A narrow tract along the eastern side of the county bordering the Ohio River lies within the Norman Upland physiographic region of the state (3). That part of the county west of a line from Mauckport northward to Ramsey is in the Crawford Upland. The remainder of the county forms the southern limit of the Mitchell Plain in Indiana. In respect to its physiographic situation in the United States, Harrison County is a part of the Highland Rim Plateau section of the Interior Low Plateaus province (3).

The Knobstone escarpment presents a maximum local relief of about 610 feet in the eastern part of the county (3). In the western part there is great diversity of relief. The central plain is broken by sinkholes, depressions, and a few entrenched streams. Near the western edge of the central plain are several isolated hills of prominence. Valleys in the western part are deep. The general slope of the county is south-southwest. Several solution valleys (streamless) exist in the western part of the county; among them are the Grassy, Brushy, Hancock, and Ripperden valleys (4). Sinkholes are sometimes found in sandstone areas because of the underlying limestones.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock is of Mississippian age. It includes strata of limestones, sandstones, siltstones, and shales. Sandstones and shales occur in the extreme eastern part. Limestones outcrop in the central part. Sandstones and limestones are exposed in the western part.

The county is in the unglaciated section of the state; however, materials of glacial origin are found in the Ohio River terraces (3).

The soils have been developed mainly from residual materials, although in parts of the county there are indications of the materials being water-worked. Certainly alluvial deposits exist in the Ohio River valley (5). Upland soils of the county have been classified as follows: Western part--Zanesville catena; central limestone plain--Frederick and Hagerstown catenas; and eastern part--Zanesville catena. Stream valley soils include: Ohio River terraces--Wheeling catena; and alluvium (where it exists)--Huntington catena. Subsoils which are moderately to slowly permeable occur over most of the county (6). River valley subsoils are mostly permeable.

Gravel is found in the Ohio River bars and terraces (7). Stream deposits of bedrock fragments also occur. Cherty gravels have been found in the uplands near the Ohio River. There are surface deposits of sand in the vicinity of Buena Vista (3). Deposits of sand are also found near DePauw.

Small lacustrine areas are to be found along the streams entering the Ohio River in the south and southwest parts (22). These are purported to be the result of flooded conditions during glacial times.

DRAINAGE FEATURES

That portion of the county northwest of a line drawn roughly between the big bend in the Ohio River north of New Amsterdam and the northeast corner of the county lies within the Blue River drainage basin of the state. The remainder of the county is in the Minor Ohio River drainage basin, also (3).

Surface drainage is best developed in the extreme eastern and western parts of the county. Streams coursing down the face of the Knobstone escarpment have high gradients. Their valley cross sections are V-shaped and their divides, sharp-crested. The influence of rock control on the courses of the larger streams is everywhere evident by their many angular bends. Blue River has a narrow valley. It has short tributaries in the county. Drainage patterns are noticeably different in the eastern, central, and western parts. The Ohio River flows close to the valley wall in a number of places. Streams crossing the Crawford Upland are meandering. Drainage is subterranean in much of the central plain where sinkholes predominate; there is a lack of surface stream development. Subterranean drainage may or may not contribute to the immediate runoff carried by the streams crossing the area. In the eastern part of the central plain where the limestone is relatively thin, surface stream systems have developed. Only the trunk streams of two of these systems (Indian Creek and Buck Creek) have been able to maintain their courses as through streams across the sinkhole portion of the plain. Smaller stream systems have become lost in sinkholes. These through streams reflect the influence of the southwesterly dip of the underlying bedrock. Indian and Buck creeks apparently flow down the dip of the bedrock. In the northwestern part, Blue River appears to be a strike stream in its meandering north-south course. The course of the Ohio River appears to be resistant rock strata along the eastern side of the county. A rather smooth channel-like belt extends in a north-south direction through the eastern third of the county.

Near New Amsterdam there is a bayou about a mile long. Ponds in plugged sinkholes are scattered throughout the limestone plain. A few water-filled basins exist in the central-northern part.

Ditches have been constructed only where necessary to improve drainage conditions.

Stream gaging stations are located on the Ohio River at Evans Landing, on Blue River at White Cloud, and on Big Indian and Little Indian creeks at Corydon (12).

Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1953.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP
HARRISON COUNTY
INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1953



HENDRICKS COUNTY

GENERAL NATURE OF THE COUNTY

Hendricks County is located in the west-central part of the state. Its area is approximately 417 square miles (1). Danville, the county seat, is 20 miles west of Indianapolis.

From data collected in surrounding counties, the mean annual precipitation should be approximately 41 inches (2). An average annual snowfall of about 20 inches can be expected.

Hendricks County lies wholly within the Tipton Till physiographic region of the state (3). In respect to its physiographic situation in the United States, it is in the Till Plains section of the Central Lowland province (3).

The surface of the county varies from nearly level to undulating. It is that of a glaciated plain dissected by the principal streams. It is ridged by moraines. Maximum local relief is about 120 feet (3). As a whole, the county is a somewhat uneven plain. Near North Salem it has a wavy surface. Morainic areas are undulating; ridges are found west of Danville. A small area has an elevation of more than 1,000 feet above sea level (3). Terraces are found along Walnut and White Lick creeks. Plain features exist south of Clayton. Areas of nearly level land occur in the northern part. Some valley walls are steep, especially in the southern part.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock in the northeastern part of the county is shale of Devonian age. In the remainder of the county, it is the Borden formation of Mississippian age. Rock is exposed in shallow valleys in the southern part.

All Hendricks County was glaciated (3). Surface drift is Wisconsin in age. The drift thickness is more than 100 feet in places. Portions of two morainic systems are found in the county (3). A rolling tract of the Bloomington moraine is in the southwestern part. A section of the Champaign moraine is in the west-central part.

The soils of the county have been derived from glacial and fluvial materials (5)(40). Underlying rock has had practically no influence on them. Upland area soils belong to the Miami and Russell catenas. Fox

soils occur on the granular deposits. Alluvial soils are of the Genesee catena. Clyde, Cope, and Westland soils are found in the depressions. Some small areas of muck occur. Subsoils are moderately permeable in sloping uplands and slowly permeable in depressions and nearly level areas (6).

Granular materials have been found along Mud Creek, Mill Creek, Ramp Run, the forks of Walnut Creek, White Lick Creek, and the forks of Mill Creek (7). Subsurface deposits of granular materials exist.

DRAINAGE FEATURES

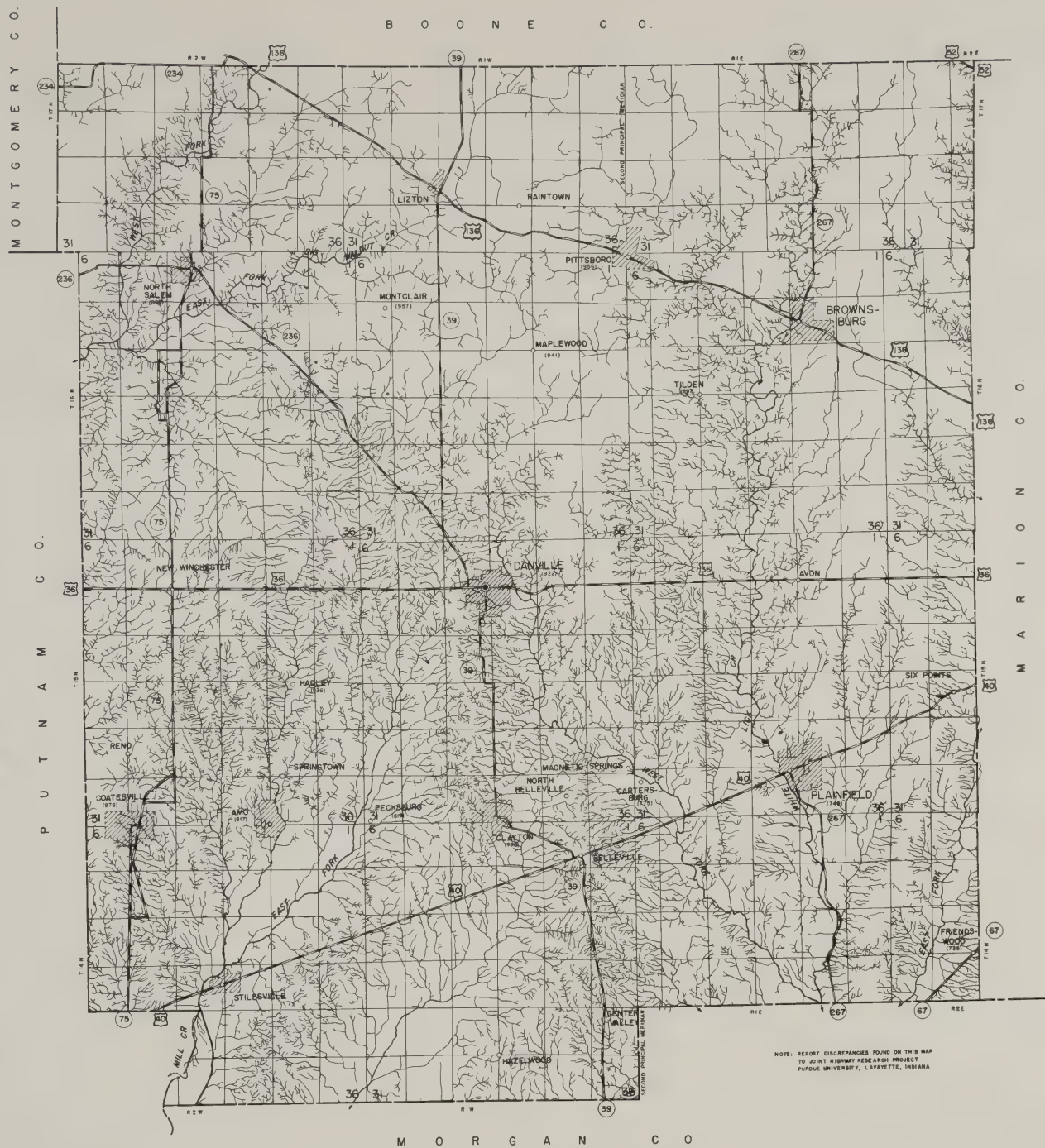
Hendricks County lies within the White River drainage basin of the state (3). The western part of the county (nearly one-half its area) is in the Eel subdivision and the remainder is in the White River basin proper.

The drainage is much better developed in the southern than in the northern part (40). Mud Creek and Mill Creek valleys are broad. The presence of sections of moraines has influenced the locations of local watershed divides and intensified the densities of drainage patterns in the central western parts of the county. Some control of stream courses and some stream deflections can be attributed, at least partially, to the presence of the moraines. Drainage is in a general southerly direction, except for the northwestern part; here it is southwesterly. Headwater streams northwest of Danville appear to be controlled by the moraine. Ramp Run flows in a northwesterly direction. Some local watershed divides are broad and nearly level. Major streams flow in glacial melt-water channels, chief of which is Walnut Creek.

There are no natural lakes in the county. Ponds of various origins are scattered throughout the area.

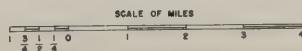
Ditches have been constructed in areas of sluggish drainage conditions.

Note: The drainage map was prepared from 1939 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1949.



DRAINAGE MAP HENDRICKS COUNTY INDIANA

PREPARED FROM
1939 AAA AERIAL PHOTOGRAPHS
BY
STATE HIGHWAY COMMISSION OF INDIANA
AT
PURDUE UNIVERSITY
1949



POLYCONIC PROJECTION

HENRY COUNTY

GENERAL NATURE OF THE COUNTY

Henry County is located in the central-eastern part of the state. Its area is approximately 400 square miles (1). New Castle, the county seat, is about 45 miles east-northeast of Indianapolis.

Mean annual precipitation is 40.11 inches at Spiceland (2). An average annual snowfall of about 20 inches can be expected.

Henry County lies almost entirely within the Tipton Till Plain physiographic region of the state; only a very small part of the southeast corner is in the Dearborn Upland (3). In respect to its physiographic situation in the United States, it is in the Till Plains section of the Central Lowland province (3).

The surface of the county is that of a glacial plain dissected by the valleys of Flat Rock and Big Blue rivers and their tributaries. It is ridged by moraines. Maximum local relief is about 100 feet (3). Morainic forms are for the most part a series of small knolls. A broad undulating tract lies near Mt. Summit, including ridges and knolls. Henry County is one of the three counties in Indiana with an average altitude of over 1,000 feet (3). In the northeastern part the features of the morainic systems are quite prominent; this includes areas east of New Castle. Intermorainic areas are gently undulating. Winding ridges are found in the northern part. A ridge lies west of Brandywine Creek.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock in most of the county is of Silurian age. There is, however, a small area in the south-eastern part where the bedrock strata are of Ordovician age. These strata are limestones and shales. Limestone outcrops southwest of Greensboro. Rock is exposed in Blue River north and south of Knightstown.

All Henry County was glaciated (3). Surface drift is Wisconsinian in age. The drift varies in thickness to more than 400 feet. Portions of three morainic systems are present in the county (8). The Shelbyville moraine covers a narrow band along the eastern side. The Champaign moraine extends from near the middle of the southern boundary to the center of the county. The Bloomington moraine crosses from the southwest corner to the northeast corner.

The soils of the county have been developed from glacial and fluvial materials (5). Upland soils are of the Miami catena. Fox and Westland soils occur on the granular deposits. Alluvial soils are of the Genesee catena. Depressed areas contain soils high in organic matter. Subsoils are moderately permeable in the sloping upland to slowly permeable in the depressions and nearly level areas (6). Permeable subsoils are found in the river valleys.

Granular materials have been obtained from terraces, knolls and ridges (7)(10). A granular ridge lies west of New Castle. Granular terraces exist along Big Blue River. Areas producing sand and gravel are found in the northern, central, and southern parts of the county.

DRAINAGE FEATURES

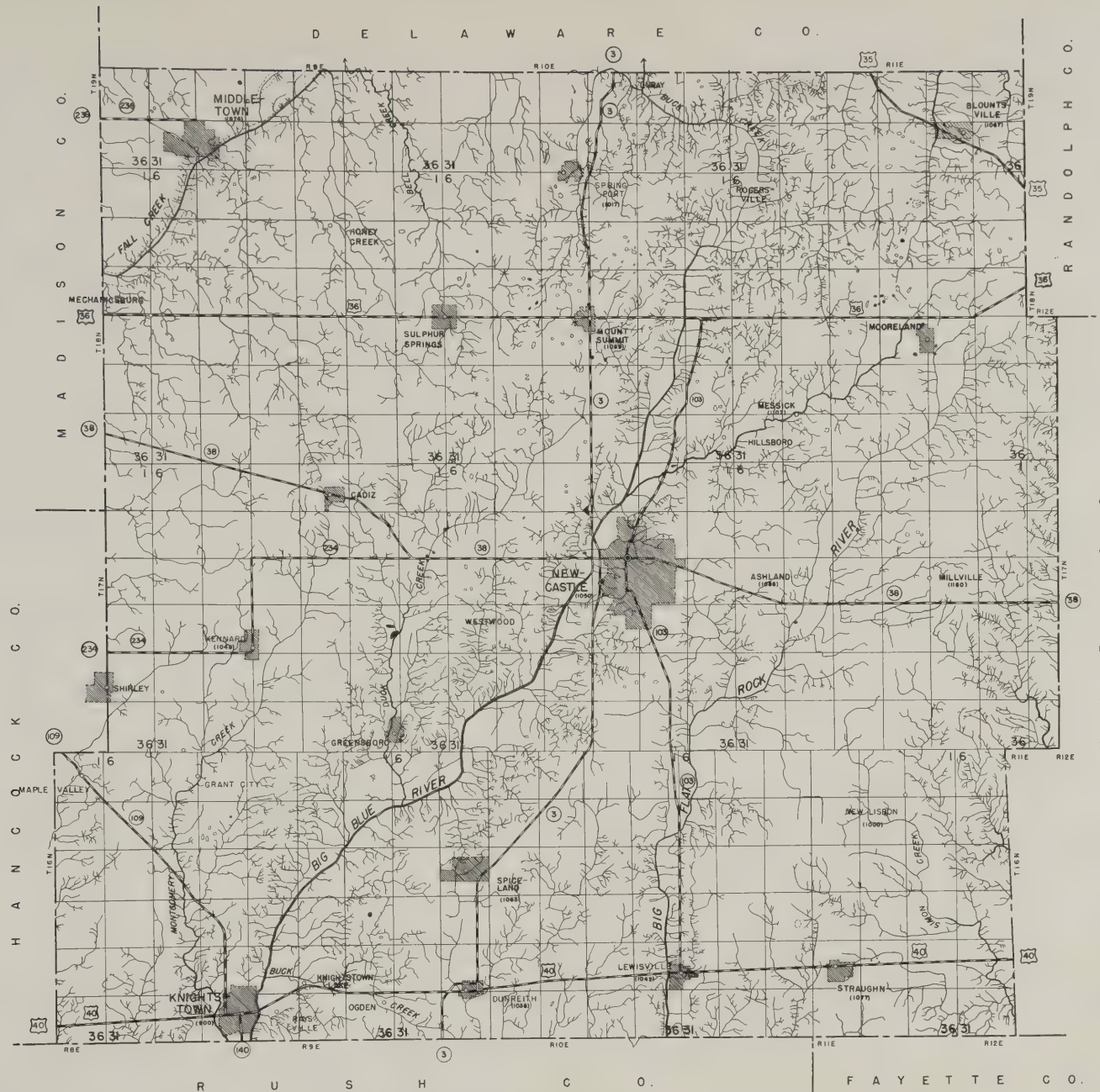
Henry County lies within two drainage basins of the state. The southeast corner of the county is in the Whitewater drainage basin. The remainder of the county (most of its area) is in the White River basin (3). Of this latter portion the northwest fourth is in the White River basin proper and the rest is in the East Fork subdivision of this basin.

The valleys of Flat Rock and Big Blue rivers appear to have acted as glacial sluiceways. Their valleys are rather wide. Surface drainage is best developed along the valleys of these and other principal streams of the county. Many tributary streams in the central northern part have wide, shallow valleys. The presence of sections of moraines in the county appears to have influenced the stream system. Location of watershed divides, stream deflections, and increased densities of drainage patterns can be associated, at least partially, with the moraines. A distinct watershed divide lies in the eastern part of the county. Drainage in the northern part is toward White River. Shallow basins occur locally throughout the county. The headwater streams of Fall Creek flow in a northerly direction before assuming a westerly direction. Noticeable are the abrupt changes in the course of the Buck Creek in the southern part. The Buck Creek in the northern part also makes wide sweeping curves. Many tributaries of Big Blue River flow in a northerly direction before being deflected into that stream. Big Flat Rock River flows south as if controlled by underlying rock strata. Some local watershed divides are broad and nearly level. Sources of Blue River lie in the moraine in the northeastern part of the county.

There are no natural lakes in the county. Ponds of various origins are scattered over the area.

Ditches have been constructed to improve drainage conditions. Streams have been dredged in various parts of the county.

Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1947.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP HENRY COUNTY INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
STATE HIGHWAY COMMISSION OF INDIANA
AT
PURDUE UNIVERSITY
1947



POLYCONIC PROJECTION

HOWARD COUNTY

GENERAL NATURE OF THE COUNTY

Howard County is located in the north-central part of the state. Its area is approximately 293 square miles (1). Kokomo, the county seat, is 50 miles north of Indianapolis.

Mean annual precipitation is 38.55 inches at Kokomo (2). An average annual snowfall of at least 25 inches can be expected.

Howard County lies wholly within the Tipton Till Plain physiographic region of the state (3). In respect to its physiographic situation in the United States it is in the Till Plains section of the Central Lowland province (3).

The surface of the county is that of a glaciated plain broken by the valleys of the Wildcat Creek and its tributaries and by the tributaries of Deer Creek. Dissection is greatest along these streams. Maximum local relief is about 55 feet (3). Rolling terrain exists along the major streams and in the morainic areas. The Wildcat Creek valley west of Kokomo is fairly deep. Generally the northern and southern sections are gently rolling.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both glacial and recent in origin. Bedrock consists of strata of Devonian and Silurian ages. Limestone outcrops along Wildcat Creek and Kokomo Creek, particularly near Kokomo.

All Howard County was glaciated (3). The surface drift is Wisconsin in age. The drift thickness varies to 200 feet. Portions of two morainic systems cross the county (10). The Bloomington moraine traverses the extreme southwestern corner. The Union City moraine extends from near the southeast corner to about the center of the Howard-Miami county line; this moraine has slight relief.

The soils of the county have been developed from glacial and fluvial materials (5). Upland soils belong to the Miami catena. Fox soils occur on the granular deposits. Alluvial soils are of the Genesee catena. Depressions have Clyde and Cope soils. Depressed areas contain soils of high organic matter. Many have muck and/or peat in them. Subsoils of moderate permeability occur in the sloping uplands (6). Slowly permeable subsoils are found in depressions and nearly level areas.

Granular materials have been found along the principal streams (7). Areas producing sands and gravels are located in the north-central, the southwestern and southeastern parts of the county.

DRAINAGE FEATURES

Howard County lies within the Wabash drainage basin of the state (3). The north-central and northwestern parts of the county are in the Deer Creek subdivision, the northeastern part is in the Pipe Creek subdivision, and the remainder of the county (about two-thirds of its area) is in the Wildcat subdivision of the basin.

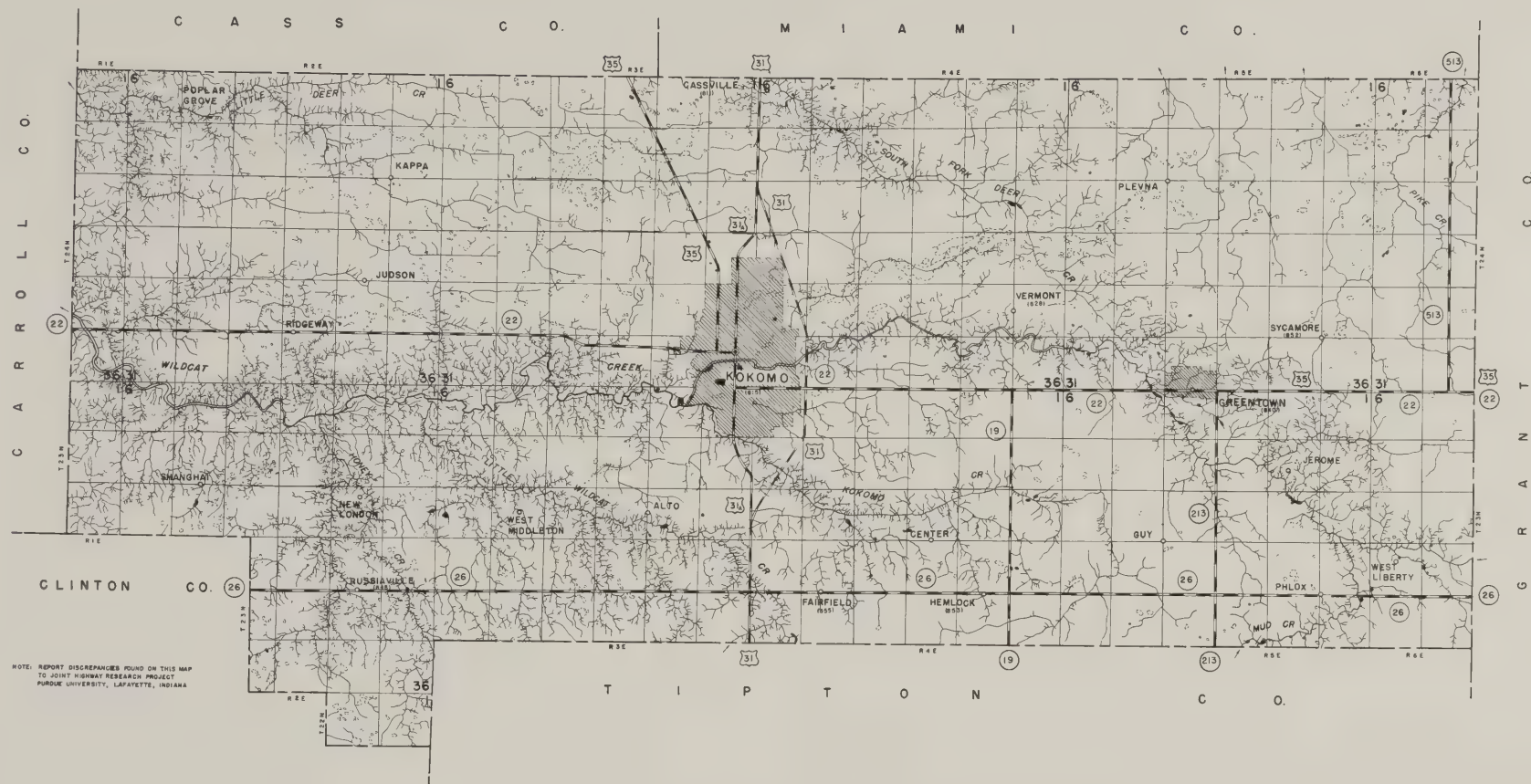
Howard County has only one principal stream -- Wildcat Creek. Natural drainage is best developed adjacent the Wildcat Creek valley. Depressions are shallow in the till plain areas. A series of depressions occurs northeast from Kokomo in what appears to be the surface expression of a filled preglacial valley. The main streams show a western trend in most of the county. In the central-southern part Kokomo Creek is deflected in a wide curve from east to west. Some local watershed divides are broad and nearly level. Tributaries of the Wildcat Creek from the north are relatively short while those from the south are fairly long. Headwater streams of Wildcat Creek flowing easterly in Tipton County combine near the northeast corner of that county. Upon entering the southeast corner of Howard County the resulting stream changes its course to a westerly direction. Streams in the northeast corner flow in a northerly direction. Watershed divides more or less outline the crests of the moraines in the county. Some increase in the densities of the drainage patterns, and some stream deflection can be attributed to the effect of the moraines on the landscape. Wildcat Creek, in the eastern part of the county, and South Fork Deer Creek nearly parallel the Union City moraine. Pike Creek is deflected to the northeast. A rather distinct watershed divide extends in an east-west direction across the center of the county.

There are no natural lakes in the county. Ponds of various origins are scattered throughout the area.

Ditches have been constructed to improve sluggish drainage conditions. Basins have been drained.

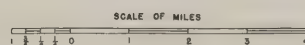
A stream gaging station is located on Wildcat Creek at Greentown (12). The drainage area of Wildcat Creek above Greentown is about 166 square miles (12).

Note: The drainage map was prepared from 1938 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1950.



DRAINAGE MAP HOWARD COUNTY INDIANA

PREPARED FROM
1938 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1950



POLYCONIC PROJECTION

HUNTINGTON COUNTY

GENERAL NATURE OF THE COUNTY

Huntington County is in the northeastern part of the state. Its area is approximately 390 square miles (1). Huntington, the county seat, is 85 miles northeast of Indianapolis.

Mean annual precipitation is 36.51 inches at Huntington and 36.06 inches at Markle (2). An average annual snowfall of about 25 inches can be expected.

The northwestern third of Huntington County lies with the Steuben Morainal Lake section of the Northern Moraine and Lake physiographic region of the state (3). The remainder of the county is in the Tipton Till Plain region. In respect to its physiographic situation in the United States, the southern part of the county is in the Till Plains section, and the northern part is in the Eastern Lake section of the Central Lowland province (3).

The surface of the county is that of an uneven glaciated plain. It is ridged by moraines and broken by the valleys of the Wabash, Little Wabash, and Salamonie rivers and their tributaries. Maximum local relief is about 90 feet (3). Morainic topography varies from swell and sag to knob and basin type. A striking topographic feature is the broad valley of the Little Wabash River; it was a glacial sluiceway. The Wabash valley west of Huntington was a glacial sluiceway, also.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock in the county consists of strata of Silurian age. Limestone outcrops at various places in the Wabash and Little Wabash river valleys. Outcrops of limestone also occur along the Salamonie River (30).

All Huntington County was glaciated. Surface drift is of Wisconsin age (5). The depth of drift varies from nearly zero (because of outcropping bedrock) at numerous places along the Wabash and Little Wabash valleys to nearly 400 feet in the southwestern corner of the county. This great depth exists in the subsurface valley of the pre-glacial Teays River system (13).

The soils have been developed mainly from glacial materials (5). Some of them have been reworked by wind and water. There has been little influence on the development of the soils by the bedrock. Soils of the uplands belong to the Miami and St. Clair catenas. Fox soils occur on the granular deposits. Bottom land soils are of the Genesee catena. Depressions contain Clyde and Westland soils. Basins contain soils high in organic matter. Upland area subsoils are mostly slowly permeable to very slowly permeable (6). River valley subsoils are very permeable.

Granular deposits are scattered widely over the county (7). Deposits of gravel exist along the rivers. Subsurface granular deposits exist.

DRAINAGE FEATURES

Huntington County lies in the Wabash drainage basin of the state (3). The northeast quarter of the county is in the Little Wabash subdivision, the southwestern third is in the Salamonie subdivision, the extreme northwest corner is in the Eel subdivision, and the remainder is in the Wabash basin proper.

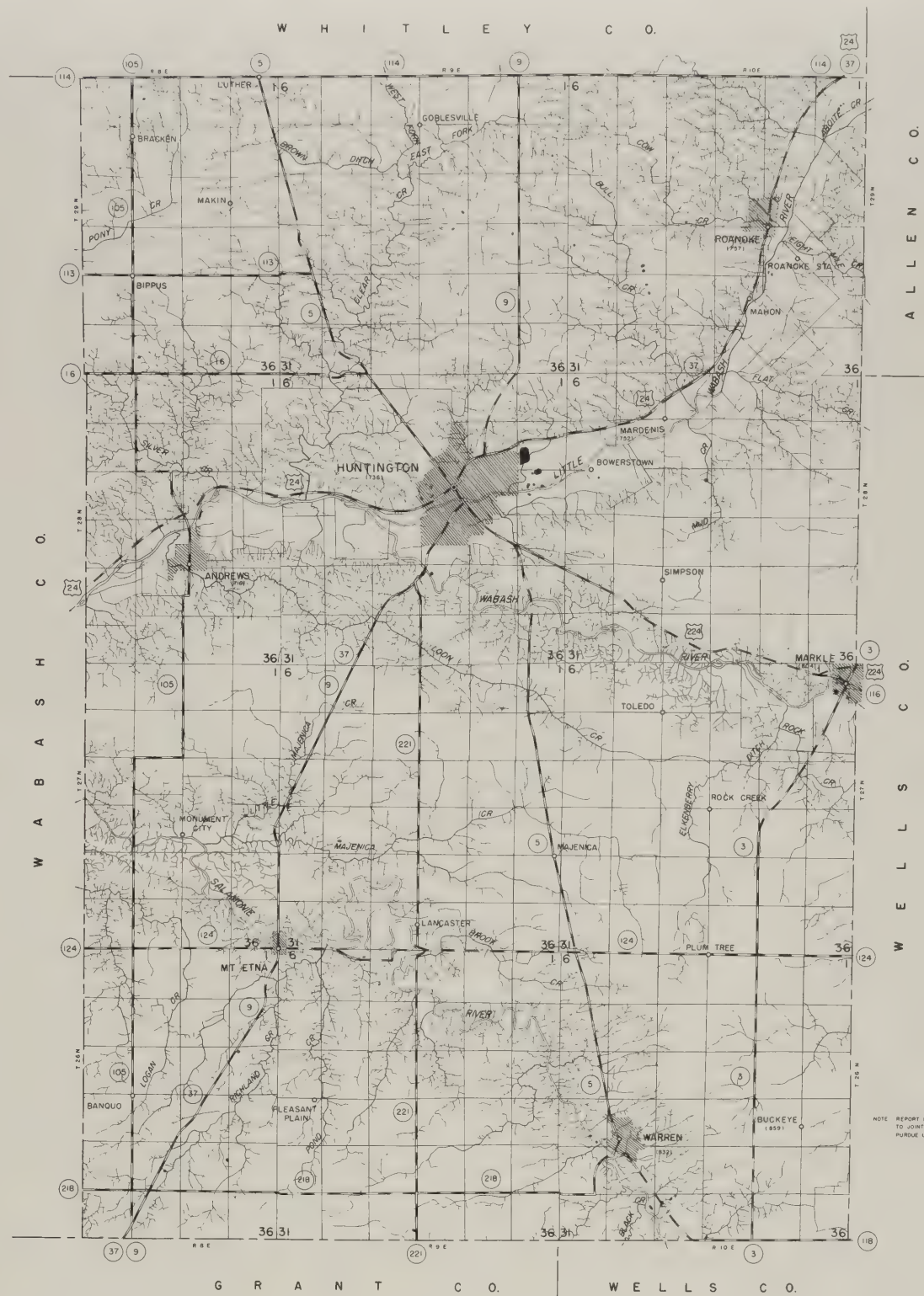
The Salamonie River is entrenched in its course through the county. The Wabash Valley is rather shallow above its junction with the valley of the Little Wabash River. Stream courses in the southwestern corner are tortuous. The Little Wabash River is a rather small misfit stream in a large valley. Headwater streams of Clear, Silver, and Pony creeks have distorted courses. Surface drainage systems are best developed adjacent the valleys of the major streams. Many local watershed divides are more or less outlined by sections of moraines in the county. The direction of the courses of streams, stream deflections, increased densities of certain drainage patterns, and the haphazard character of the patterns can probably be attributed to the presence of the moraines. Logan Creek has a curving course. Prairie Creek is deflected eastward near its mouth. Majenica Creek appears to have been affected by the moraine, causing its westerly course. Tributaries of Clear Creek in the northern part are contorted. Silver Creek flows southeasterly before being deflected into the Wabash River. Some local watershed divides are broad and nearly level. The courses of Rock Creek and Loon Creek may have been affected by the moraine.

There are no natural lakes in the county. Ponds of various origins are scattered throughout the area.

Ditches have been constructed to improve sluggish drainage conditions in the nearly level tracts. Streams have been dredged in various sections.

Stream gaging stations are located on the Little Wabash River at and near Huntington (12). The drainage area of the Little Wabash River is about 290 square miles (11).

Note: The drainage map was prepared from 1938 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1955.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP HUNTINGTON COUNTY INDIANA

PREPARED FROM
1938 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1955



JACKSON COUNTY

GENERAL NATURE OF THE COUNTY

Jackson County is located in the south-central part of the state. Its area is approximately 520 square miles (1). Brownstown, the county seat, is about 60 miles south of Indianapolis.

Mean annual precipitation is 41.80 inches at Seymour (2). An average annual snowfall of about 20 inches can be expected.

The western third of Jackson County lies within the Norman Upland physiographic region of the state, and the remainder is in the Scottsburg Lowland (3). In respect to its physiographic situation in the United States the Norman Upland portion is in the Highland Rim Plateau section of the Interior Low Plateaus province. The remainder of the county is in the Till Plain section of the Central Lowland province (3).

The surface of the county varies from nearly level to hilly. The central and eastern parts are a portion of a glaciated plain modified by wind and water action and broken by the valleys of East Fork White River, Muscatatuck River, and their tributaries. The western part is a stream dissected plain, at least partly unglaciated. Maximum local relief is about 360 feet (3). Many valleys are wide. East Fork White River flows in a glacial sluiceway which is broad and gently sloping. Morainic topography is distinct. Some interstream areas in the eastern part are gently rolling.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock formations of Devonian age occupy small areas in the eastern part of the county. Strata of Mississippian age occur as the bedrock in the remainder of the county. Outcrops of shale are found along East Fork White River near Rockford and along the Muscatatuck River at several places in the southeastern part of the county. Sandstones, shales, and limestones are found in the western part. The Mt. Carmel fault crosses the southwestern corner (4).

The western part of the county lies in the driftless region of the state (3). The remainder was glaciated, with the possible exception of the Brownstown Hills. These hills are outliers of the Knobstone within the glacial drift area. The drift is Illinoian in age (28). It is thin on the hills along the escarpment and along the drift border. Chestnut Ridge is an Illinoian drift moraine (10). It is located south of Seymour. It contains granular materials. The features of the moraine are very prominent.

The soils of the county have been derived from glacial and residual materials (5). Many have been reworked by wind and water. Sandstone-shale soils belong to the Zanesville catena. Limestone soils belong to the Hagerstown and Frederick catenas. Illinoian drift soils are of the Cincinnati and Jennings catenas. Sand areas have Princeton soils. Alluvial soils belong to the Genesee and Pope catenas. Slowly permeable to very slowly permeable subsoils are found in the southeastern and northern uplands (6). The remainder of the uplands in the county have slowly permeable subsoils. Sandy area subsoils are mostly permeable. River valley subsoils are mostly permeable to very permeable.

Granular deposits are found west of the East Fork White River near Seymour and Brownstown (7). Areas producing sands and gravels are located mostly along East Fork White River. Stream deposits of local bedrock fragments are found in the western part. Chestnut Ridge contains granular materials. Sand dunes exist between Reddington and Seymour and south of Vallonia.

Lacustrine areas occur along Sand Creek and the Muscatatuck River system. Remnants of lakebeds are found along the Salt Creek system in the northwestern part. Buried soils have been encountered in the valley of the East Fork White River.

DRAINAGE FEATURES

Jackson County lies wholly within the White River drainage basin of the state (3). The southeastern fourth of the county is in the Muscatatuck subdivision of the White basin and the remainder of the county is in the East Fork subdivision of the basin.

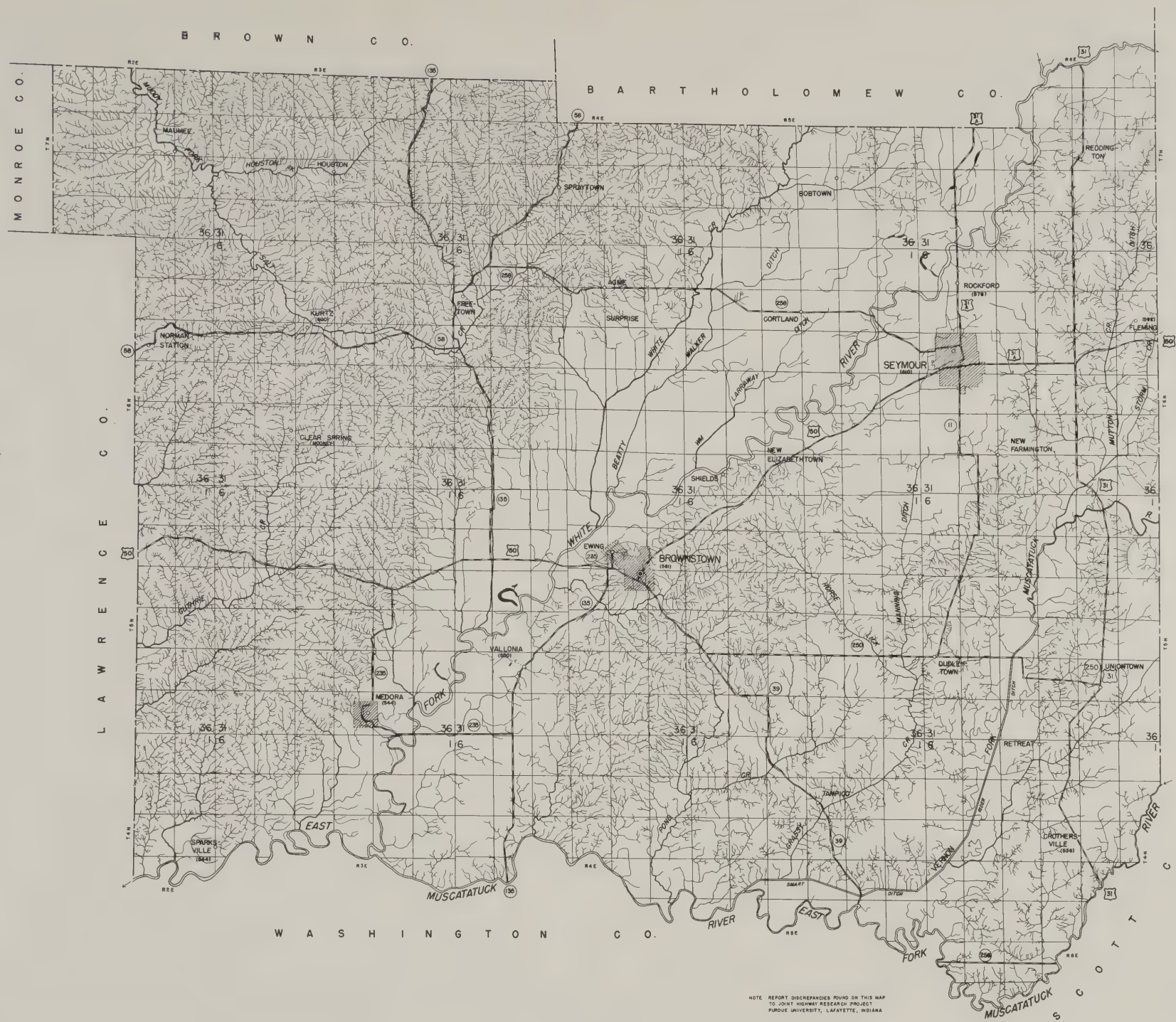
The general trend of the drainage is to the southwest. Surface drainage is weakly developed on the granular terraces and sand areas because of excellent internal drainage. Drainage patterns are noticeably different in the eastern, central and western parts. There is an absence of a developed drainage pattern in the East Fork White River valley. The deflected course of White Creek is noticeable; it is probably due to the terrace along East Fork White River. The crest of the Knobstone escarpment is the watershed divide in the western part of the county. Noticeable is the northwesterly course of Muddy Fork Salt Creek. Natural drainage systems are most fully developed in the western part of the county and in the Brownstown Hills. The crest of Chestnut Ridge is rather well-defined by surface streams. The Muscatatuck River has a low gradient in crossing the Scottsburg Lowland. The East Fork White River is relatively swift above its junction with the Muscatatuck. The Sand Creek valley is alluviated. White Creek valley is alluviated, also. A few short tributaries enter White River in the southwestern part. In the western part, the perfection and symmetry of the drainage lines are notable features.

There are no natural lakes in the county. A few water-filled, abandoned meanders have been mapped along the East Fork White River. Ponds of various origins are scattered throughout the area. A gaging station is located on Starve Hollow Lake (12).

Ditches have been constructed in the low-lying, nearly level lands. Vernon Fork Muscatatuck River is a typical example of some of the streams that have been dredged.

A stream gaging station is located on East Fork White River near Seymour (12). The drainage area of the East Fork White River above Seymour is about 2,390 square miles (11).

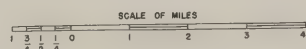
Note: The drainage map was prepared from 1937 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1947.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP JACKSON COUNTY INDIANA

PREPARED FROM
1937 AAA AERIAL PHOTOGRAPHS
BY
STATE HIGHWAY COMMISSION OF INDIANA
AT
PURDUE UNIVERSITY
1947



POLYCONIC PROJECTION

JASPER COUNTY

GENERAL NATURE OF THE COUNTY

Jasper County is located in the northwestern part of the state. Its area is approximately 562 square miles (1). Rensselaer, the county seat, is 100 miles northwest of Indianapolis.

Mean annual precipitation is 37.77 inches at Collegeville and 34.60 inches at Wheatfield (2). An average annual snowfall of about 25 to 30 inches can be expected.

A small area in the southern part of Jasper County lies within the Tipton Till Plain physiographic region of the state (3). Most of the county, however, is in the Kankakee Lacustrine section of the Northern Moraine and Lake Region. In respect to its physiographic situation in the United States, the small southern area is in the Till Plains section and the remainder is in the Eastern Lake section of the Central Lowland province (3).

The surface of the county varies from a nearly level lacustrine plain to morainic ridges. It is that of a glacial plain broken by the valleys of the Iroquois and Kankakee rivers and their tributaries. It has been modified by wind and water action. Maximum local relief is about 55 feet (3). High points in the county are along the moraine. The moraine is composed of low knolls and ridges along which are scattered shallow basins. It has a gradual slope on the north but is rather abrupt on the south side. The northern slope has low swells and hummocks among which are shallow basins. Sand dunes are prominent in the northern part of the county. Sandy tracts in the southern part are nearly flat.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock in the north-eastern third of the county consists of strata of Devonian age; the bedrock in the southern third is also Devonian in age; and that in the remainder of the county is of Silurian age. Limestone outcrops along the Iroquois River near Rensselaer and in the bed of the Pickamink River. Shale and sandstone outcrops occur along Carpenters Creek.

All Jasper County was glaciated (3). Surface drift is of Wisconsin age. The drift attains a thickness of more than 100 feet in parts of the county. The Marsailles moraine crosses the county from west to east through the central part and trends northward into Pulaski County (9). The crest of the moraine presents very little range in altitude.

The soils of the county have been derived from glacial materials, much of which have been reworked by wind and water (5). Upland soils belong to the Parr and Miami catenas. Plainfield and Newton soils occur on the sand deposits. Griffin soils are alluvial. Muck and peat occur in depressions. Many other depressions contain soils of high organic content. A large part of the southern half of the county has moderately to slowly permeable subsoils (6). Sandy and gravelly areas in the southeastern and northern parts have very permeable subsoils.

Gravel has been obtained in the central part of the county (7). Morainic knolls and ridges are granular. Areas producing sands and gravels are located mainly in the central and northeastern parts. The northern part of the county (the Kankakee Valley) is a lacustrine sand

plain upon which is superimposed many sand dunes and ridges. The sand is relatively free from pebbles. The sand ridges have an east-west trend. An east-west sand ridge extends across the southern part of the county. A deposit of fine silt lies southwest of Rensselaer (9).

DRAINAGE FEATURES

Jasper County lies almost entirely within the Kankakee drainage basin of the state (3). Only small areas in the east-central and south-eastern parts are in the Tippecanoe subdivision of the Wabash drainage basin.

Natural drainage is perhaps best developed along the valleys of the principal streams, with the exception of the Kankakee River. The divide between the headwaters of the Iroquois River and the Monon Creek system is low and nearly flat. Curtis Creek (Kent Ditch) crosses the Marsailles moraine. Local watershed divides are somewhat determined by sections of the moraine, although it is crossed by a few principal tributaries of the Iroquois River. The moraine is more or less outlined by the fine-textured drainage patterns. The Iroquois River watershed extends to halfway between the moraine and the Kankakee River. A north-south divide extends through the central-eastern part. Erosion on the sand dunes is reduced to a minimum. Many local watershed divides are broad and nearly level. The Iroquois Valley is included as a part of the Kankakee lacustrine section.

Numerous small lakes and ponds have been mapped in various parts of the county. A gaging station is located on Ringneck Lake. The Kankakee River was formerly a very meandering stream and remnants of the old stream exist in the many oxbows near the present channel. The land immediately adjacent to the stream is swampy.

There are many dredged ditches in the county. Streams also have been straightened, widened, and deepened artificially, the outstanding example being the Kankakee River. Some drainage changes have been made. Former lakes have been obliterated by dredging. The ground water level has been lowered along the Kankakee River.

Stream gaging stations are located on the Iroquois River near Rosebud, near North Marion, and at Rensselaer; on Bice Ditch near South Marion, and on Big Slough Creek at Collegeville; on Carpenter Creek at Egypt; on Oliver Ditch near Aix; and on the Kankakee River above Dunns Bridge (12). The drainage area of the Kankakee River above Dunns Bridge is about 1,326 square miles, and that of the Iroquois River above Rensselaer, about 195 square miles (12).

Note: The drainage map was prepared from 1939 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1950.

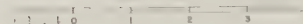


NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP JASPER COUNTY INDIANA

PREPARED FROM
1939 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1950

SCALE OF MILES



JAY COUNTY

GENERAL NATURE OF THE COUNTY

Jay County is located in the eastern part of the state. Its area is approximately 386 square miles (1). Portland, the county seat, is 80 miles northeast of Indianapolis.

Mean annual precipitation is 38.86 inches at Salamonie (2). An average annual snowfall from 25 to 30 inches can be expected.

Jay County lies wholly within the Tipton Till Plain physiographic region of the state (3). In respect to its physiographic situation in the United States it is in the Till Plains section of the Central Lowland province (3).

The surface of the county is that of a glaciated plain. It is broken by the valleys of the Wabash and Salamonie rivers and their tributaries. Maximum local relief is about 100 feet (3). Depressed areas exist in the northwest corner of the county. Morainic topography is of the swell and sag type. There are a few distinct knolls. Intermorainic areas are gently undulating.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Bedrock consists of strata of Silurian age. Outcrops of limestone occur along the Wabash River near New Corydon and along the Salamonie River near Portland.

All Jay County was glaciated (3). Surface drift is of Wisconsin age. The drift thickness is as much as 350 feet. It is deepest in the subsurface valley of the preglacial Teays River. The county is crossed in a more or less east-west direction by sections of two morainic systems (8). The Mississinewa moraine covers a portion of the southern part and is rather broad. A much narrower band in the central part is covered by the Salamonie moraine.

The soils of the county have been developed from materials of glacial and fluvial origin (5). Upland soils belong to the St. Clair and Miami catenas. Fox soils are found on the granular deposits. Alluvial soils are of the Genesee catena. Clyde soils occur in the depressions. Many of the depressed areas contain soils having high organic content. Subsoils vary from slowly to very slowly permeable over most of the county (6).

Granular materials have been found in ridges, knolls, and along streams (7). Old channels, also, contain deposits of sand and gravel. Sand deposits are located mainly along the Salamonie River system.

DRAINAGE FEATURES

Jay County lies within the Wabash drainage basin of the state (3). The southern and southwestern parts are in the Mississinewa subdivision of the Wabash basin, the central and northwestern parts are in the Salamonie subdivision, and the northeastern part is in the Wabash basin proper.

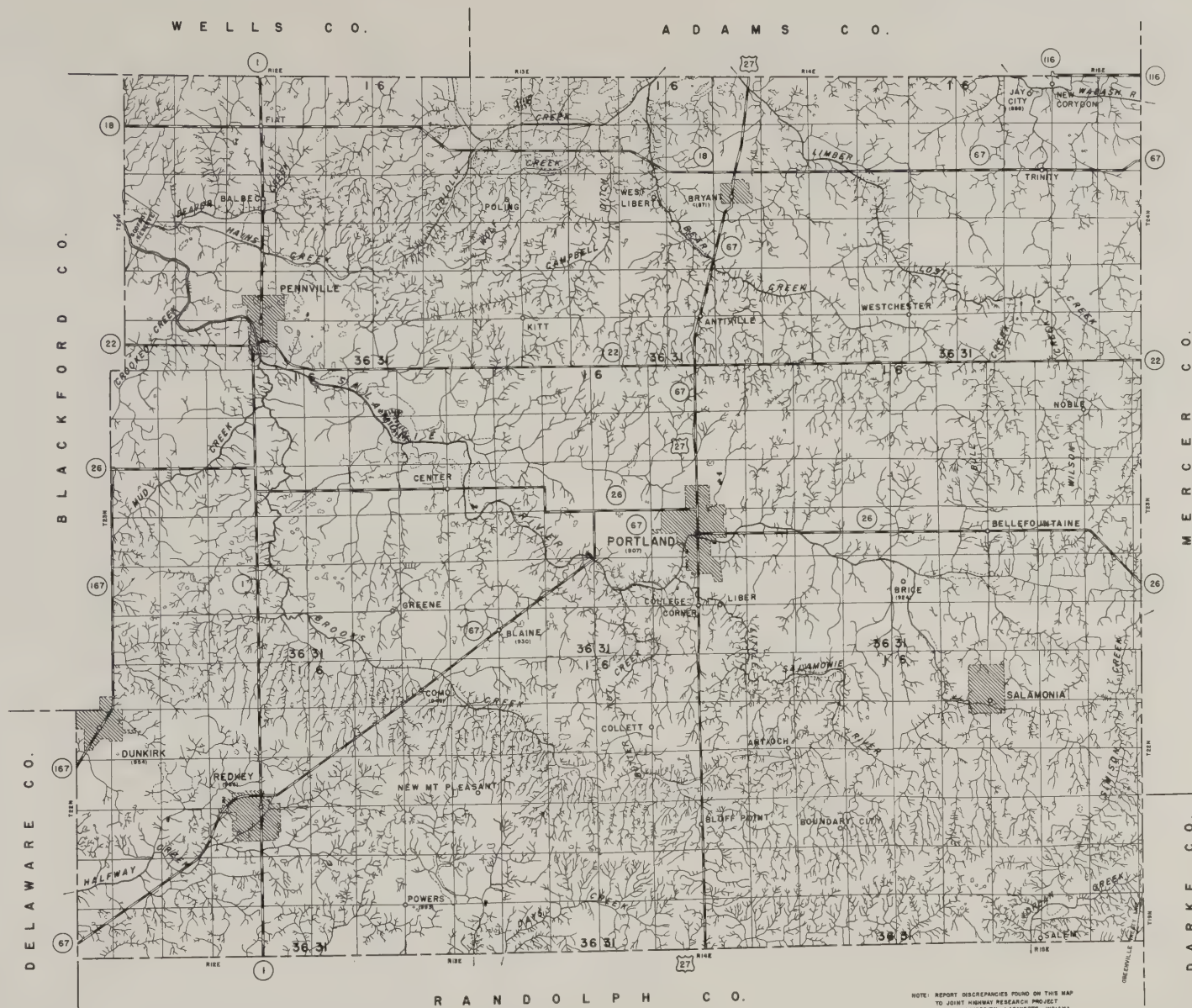
A small area in the southeastern part drains northeasterly into Ohio via Simison Creek, and a small area in the northeastern part also drains into Ohio. Loblolly Creek and Hains Creek flow in the surface expression of the subsurface Teays valley. Limberlost and Bear creeks flow nearly parallel to each other and to the Wabash River. The Wabash valley is a rather shallow one in the county. The courses of Bear and Limberlost creeks seem to be influenced by the moraines. Surface drainage is best developed along the valleys of the major streams. The course of the Salamonie River is controlled by the Salamonie moraine; the course of the Wabash River is controlled by the Wabash moraine. The crests of the moraines more or less outline the watershed divides. Stream deflections and increased densities of drainage patterns can be attributed to the presence of the moraines. Several small streams show distorted courses. Brooks Creek and Little Salamonie River flow nearly parallel to the Salamonie River. Short tributaries flow into the Wabash River. Some local watershed divides are broad and nearly level.

There are no natural lakes in the county. Ponds of various origins have been mapped in many sections of the area.

Before entering Indiana, the Wabash River drains about 295 square miles of western Ohio (11). The Salamonie River also has a small drainage area in Ohio.

Ditches have been constructed to relieve sluggish drainage conditions. Some streams have been dredged.

Note: The drainage map was prepared from 1941 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1953.

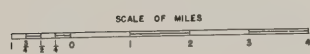


R A N D O L P H C O .

NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP JAY COUNTY INDIANA

PREPARED FROM
1941 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1953



POLYCONIC PROJECTION

DRAWN BY R.C.CORDERO

JEFFERSON COUNTY

GENERAL NATURE OF THE COUNTY

Jefferson County is located in the southeastern part of the state. Its area is approximately 366 square miles (1). Madison, the county seat, is 80 miles southeast of Indianapolis.

Mean annual precipitation is 43.66 inches at Madison (2). An average annual snowfall of 20 to 25 inches can be expected.

Jefferson County lies within three physiographic regions of the state. The eastern fourth is in the Dearborn Upland (3). Most of the remainder of the county is in the Muscatatuck Regional Slope, except for a small area in the western part which is in the Scottsburg Lowland (3). In respect to its physiographic situation in the United States, the county is in the Till Plains section of the Central Lowlands province (3).

The surface of the county is that of a glaciated plain from part of which the drift has been eroded. The Ohio River and Indian-Kentuck Creek have cut deep valleys into the plain. Remnants of the upland exist in long, nearly level ridges. Maximum local relief is about 460 feet (3). There is a nearly level tract extending northward from Madison to the county line. Wind action has modified the terrain to some extent; there are a few sand dunes present on the Ohio River terraces. Interstream areas are gently undulating in the western part. Sinkholes pit the terrain along drainageways carved into limestone. Streams are entrenched in the western part. In the eastern part interstream ridges appear to be near the same elevation.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both glacial and recent in origin. Bedrock in the western part of the county is Devonian in age; in the central part it is of Silurian age; and in the eastern part it consists of strata of Ordovician age. There are rock outcrops in nearly all parts of the county. Shale outcrops in the western part. Limestone is near the surface in the northern part.

All Jefferson County was glaciated. The drift is Illinoian in age (8)(28). Erosion has removed much of the drift from the valley wall slopes of the Ohio River and from the Indian-Kentuck Creek watersheds. This has also occurred along some of the other large streams of the county. The drift is thin on the ridge tops near the river but thicker in the heads of valleys farther from the river.

The soils of the county have been developed from glacial, fluvial and residual materials (5). Illinoian drift soils belong to the Cincinnati, Jennings, and Grayford catenas. Limestone-shale soils are of the Switzerland catena. Bottom land soils are of the Huntington and Pope catenas. The subsoils in the western part vary from slowly to very slowly permeable (6). In the eastern part they are slowly permeable.

Some granular materials are found in terraces along the Ohio River, particularly near Brooksbury, Madison, and Hanover (7). Deposits of fragments of local rocks are found along the small streams of the county.

Silt terraces are found in the Indian-Kentuck Creek valley near Brooksbury. Valleys of other streams entering the Ohio River are alluviated near the river (22). This is probably the result of flooded conditions during glacial times.

DRAINAGE FEATURES

Jefferson County lies within two drainage basins of the state (3). The eastern and southern parts are in the Minor Ohio drainage basin. The western part is in the Muscatatuck subdivision of the White River drainage basin.

The Ohio River is deeply entrenched. It is the base toward which the streams of the adjacent uplands are eroding. Likewise, Indian-Kentuck Creek is deeply entrenched. Many of the lesser tributaries of these two streams are relatively short; therefore, their gradients are high. There is some subterranean drainage. This occurs adjacent to the streams, mostly in the western part. This type drainage may or may not contribute to the flow of the streams in the immediate area. Many streams flow on rock in portions of their courses. Natural drainage is most fully developed in the eastern part of the county. The western part may also be considered well-drained. Where streams are deeply incised in limestone, the flood plains are narrow and valley walls steep. In the western part of the county, the north-south portions of the reaches of some of the streams are along the strike faces of resistant rock strata. The Indian-Kentuck Creek system also has definite north-south valley sections. Streams in the western part reflect the influence of the westerly dip of the underlying bedrock. Drainage patterns are noticeably different in the eastern and western parts. Natural drainage in some interstream areas is impeded. A major watershed divide extends northeastward from near the southwestern corner of the county to the center of the northern boundary. West of Madison, a headwater tributary of the Big Creek forms within about a mile of the Ohio River, and drainage is to the Wabash River. The Ohio River flows close to the valley wall in a number of places. An example of stream piracy is the interception of westerly flowing streams of Big Creek by Clifty Creek. Streams entering the Ohio River in the vicinity of Madison and Hanover have waterfalls in their channels. South of Madison the course of the Ohio River appears to be controlled by resistant rock strata. Streams flowing on rock often show minor deflections due to resistant and nonresistant strata. Some local watershed divides are broad and nearly level.

There are no natural lakes in the county. Ponds of various origins are scattered throughout the area.

Ditches have been constructed only where necessary to improve drainage conditions. Drainage in the Illinoian drift covered uplands is accomplished by shallow surface ditches.

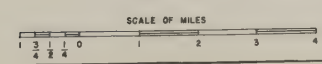
Stream gaging stations are located on the Ohio River at Madison and on the Muscatatuck River near Deputy (12).

Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1948.



DRAINAGE MAP
JEFFERSON COUNTY
INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
STATE HIGHWAY COMMISSION OF INDIANA
AT
PURDUE UNIVERSITY
1948



JENNINGS COUNTY

GENERAL NATURE OF THE COUNTY

Jennings County is located in the southeastern part of the state. Its area is approximately 377 square miles (1). Vernon, the county seat, is 60 miles southeast of Indianapolis.

Mean annual precipitation is 45.51 inches at North Vernon (2). An average annual snowfall of about 25 inches can be expected.

The southwestern quarter of Jennings County lies within the Scottsburg Lowland physiographic region of the state (3). The remainder of the county is in the Muscatatuck Regional Slope. In respect to its physiographic situation in the United States the county is in the Till Plains section of the Central Lowland province (3).

The surface of the county varies from nearly level to rolling. It is that of a glacial plain rather deeply dissected by the major streams, an example of which is the entrenchment of Vernon Fork Muscatatuck River near the town of Vernon. Maximum local relief is about 165 feet (3). Upland interstream areas in most of the county are relatively flat; they vary in width, some being very narrow. Dissection by tributary streams is perhaps most highly developed along the Muscatatuck in the central part of the county. Sinkholes are to be found adjacent to the major stream valleys throughout the central part of the county. The general slope of most of the county is to the southwest. The valley of the Muscatatuck River is broad and shallow near the Jackson County line.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary deposits are both Pleistocene and recent in age. Bedrock in the eastern part of the county consists of strata of Silurian age. In the remainder of the county it is of Devonian age. The underlying limestones and shales are exposed in many places in the dissected areas and quarries have been operated. Shale outcrops in all but the northeastern quarter of the county. It is exposed in stream valleys and highway rights-of-way.

All Jennings County was glaciated (3). Glacial drift in a small area in the northwestern corner is Wisconsin in age. The remainder of the county is covered with Illinoian drift (28). The drift has been removed by erosion from the valley slopes. The Shelbyville moraine crosses the extreme northwest corner of the county. The contrast between the colors of the soils of the Wisconsin and Illinoian drifts makes the boundary apparent (10).

Most of the soils have been developed from glacial and fluvial materials (5)(41). Weathering limestones and shales have affected them only in certain areas; e.g., along the major streams where the drift has been eroded. Soils of the Wisconsin drift areas are of the Russell catena. Soils of the uplands in the Illinoian drift portion are of the Cincinnati and Jennings catenas. Grayford soils are also found in the Illinoian drift areas. Sand areas have Elkinsville soils. Soils of the bottom lands are of the Pope catena. A few depressions contain soils having a high organic content. Most upland subsoils vary from slowly to very slowly permeable (6). Subsoils of sloping lands in the northwest corner are moderately permeable. River valley subsoils are mostly permeable.

Some gravel occurs in the bars of the large streams (7). Deposits of fragments of local rocks are found along the small streams of the county. Cherty gravels occur in the Brush Creek watershed, as well as in several other stream valleys. There is a very small area of sand along Sand Creek near the Jackson County line.

DRAINAGE FEATURES

Jennings County lies wholly within the White River drainage basin of the state (3). The northwestern quarter is in the East Fork subdivision and the remainder is in the Muscatatuck subdivision of the basin.

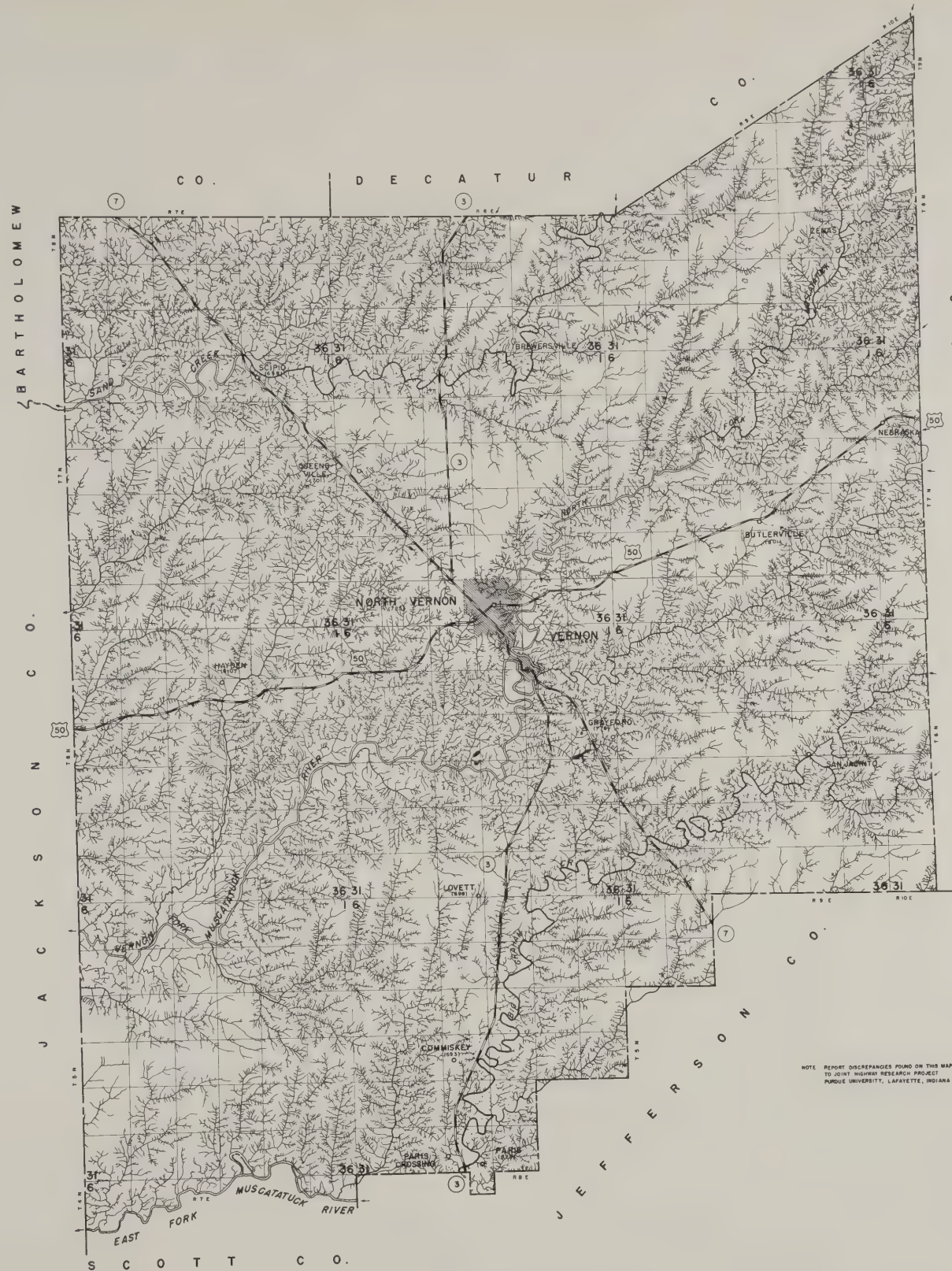
The direction of flow of the streams appears to be controlled by the regional slope. This is indicated by the long, nearly parallel streams having a southwesterly trend. Also, this is due, at least partially, to the dip of the bedrock. Streams flowing in bedrock show the effect of rock control by their many angular bends and their entrenchment. In the meandering portions of its north-south course, Vernon Fork Muscatatuck River appears to be a strike stream. This situation exists in similar north-south reaches of Sand and Big Graham creeks. Minor tributaries are short and have relatively high gradients near the main streams. Low gradient gullies extend for long distances into the gently sloping uplands. Sand Creek has a meandering, rock-controlled course in the northern part of the county. The Sand Creek valley is alluviated near the west county line. Natural drainage is better developed near the valleys of the major streams than in the interfluvies. In some interstream areas natural drainage is impeded. Dissection in the northwest part is slight. Some local watershed divides are broad and nearly level. There is some subterranean drainage. This occurs adjacent to the major stream valleys in the central part of the county, but it may or may not contribute to the immediate runoff in those streams. In the southwest corner, the south-flowing tributaries of East Fork Muscatatuck River are small. Where streams are deeply incised in limestone the flood plains are narrow and valley walls steep. Drainage patterns are more or less uniform over most of the county. A small section of moraine in the northwest corner effects the pattern only locally.

While there are no natural lakes, artificial lakes and ponds of various origins exist in several sections of the county.

Some ditches have been constructed as is apparent in the southwest corner of the county. Sluggish drainage conditions in other parts of the county have been improved by ditches. Drainage in the Illinoian drift covered uplands is accomplished by shallow surface ditches.

Stream gaging stations are located on Vernon Fork Muscatatuck River at Vernon; on North Fork near Butlerville; and on Sand Creek near Brewersville (12). The drainage area of Vernon Fork Muscatatuck River above Vernon is about 208 square miles (12).

Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1949.



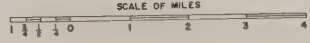
NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP JENNINGS COUNTY INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY

1949

SCALE OF MILES



JOHNSON COUNTY

GENERAL NATURE OF THE COUNTY

Johnson County is located in the south-central part of the state. Its area is approximately 315 square miles (1). Franklin, the county seat, is 20 miles south-southeast of Indianapolis.

Mean annual precipitation is 36.96 inches at Franklin (2). An average annual snowfall of approximately 20 inches can be expected.

The southeastern quarter of Johnson County lies with the Scottsburg Lowland physiographic region of the state (3). A small portion of the southwestern corner is in the Norman Upland. The remainder of the county is in the Tipton Till Plain region. In respect to its physiographic situation in the United States the county is in the Till Plains section of the Central Lowland province (3).

The surface of the county varies from a gently undulating glacial till plain to an almost rugged stream dissected residual upland. Maximum local relief is about 225 feet (3). The northwestern part varies from somewhat rolling to nearly level; a ridge exists south of Pleasant Run. Morainic topography is rather conspicuous in the northeastern part; ridges occupy parts of the terrain. In the southeastern part of the county valley trains occur along the streams. Some shallow depressions are found in the northeast and southwest. Depressed areas occur along Grassy, Hurricane and Youngs creeks. Local depressions occur elsewhere. The till plain area adjacent to the Knobstone escarpment is dissected. The Knobstone escarpment merges with the till plain in the southwest corner of the county. Knolls are conspicuous east of Franklin.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock in the southwestern third of the county consists of strata of Mississippian age, and in the remainder of the county the bedrock is of Devonian age. Shale outcrops along Sugar Creek in the southeastern part of the county. Rock outcrops in the southwestern part.

All Johnson County has been glaciated (3). Surface drift in a small area in the southwestern part is Illinoian in age (9). In the remainder of the area it is Wisconsin in age. The drift thickness varies from a few feet to as much as 150 feet. Erosion has removed a great amount of the drift in the extreme southwest corner of the county. The drift is rather thin in the western part. The county is traversed in a general east-west direction by the sections of three morainic systems -- the Shelbyville in the south, the Champaign in the central, and the Bloomington in the northern part (10).

The soils of the county have been developed mainly from glacial drift and fluvial materials (7)(42). They have been influenced to some extent by the underlying bedrock in the southwestern part. Wisconsin drift soils belong to the Miami and Russell catenas. Illinoian drift soils belong to the Cincinnati catena. Soils of the Zanesville catena occur in the sandstone-shale areas. Alluvial soils are of the Genesee catena. Fox soils are found on the granular deposits. Small deposits of muck and peat occur in the east-central part near the county line. Other depressions have soils of high organic content. Most upland subsoils are moderately to slowly permeable (8). Subsoils in the southwest corner are slowly to very slowly permeable. River valley subsoils are very permeable.

Granular materials have been obtained from stream terraces and from morainic knolls and ridges (7). A granular ridge extends southwest from Franklin. Areas producing sands and gravels are located in the northwestern, northern, and eastern parts. Gravel has been found along White River, Indian Creek, Blue River, Sugar Creek, Buckheart Creek, Nineveh Creek, Hurricane Creek, and Crooked Creek. The valley fill at Edinburg is quite deep; it is granular in texture. Some wind-deposited sands are found in the White River valley (42).

DRAINAGE FEATURES

Johnson County lies within the White River drainage basin of the state (3). The western third is in the White River basin proper and the remainder is in the East Fork subdivision of that basin.

Drainage systems are well developed in the southwestern corner of the county. The Blue River and Sugar Creek valleys acted as glacial sluiceways. The White River valley was also a glacial sluiceway. Stream systems in the southeast corner appear to be influenced by the Scottsburg Lowland in their courses southward. A watershed divide extends in a general north-south line through the center of the county. Local watershed divides tend to follow the crests of sections of moraines. Some stream deflections and increased densities of drainage patterns are associated with the moraines. Some stream courses appear to have been influenced by the presence of the moraines. The Youngs Creek system crosses a morainic area; it has a tortuous course. Streams in the western part are tributaries of White River. Many have curving courses. White River, Big Blue River, and Sugar Creek are large streams that cross the county but which do not originate within it. Some local watershed divides are broad and nearly level. Nearly all the headwater streams of the lesser tributaries show deflection; many are located in the central-northern part.

There are no natural lakes in the county. Ponds of various origins are scattered throughout the area.

Ditches have been constructed to improve drainage conditions in many sections. Some streams have been dredged.

Stream gaging stations are located on Sugar Creek; on Youngs Creek; and on Driftwood River -- all near Edinburg (12). The drainage area of Driftwood River above Edinburg is about 1,040 square miles (12).

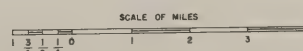
Note: The drainage map was prepared from 1941 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1949.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP JOHNSON COUNTY INDIANA

PREPARED FROM
1941 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1949



POLYCONIC PROJECTION

KNOX COUNTY

GENERAL NATURE OF THE COUNTY

Knox County is located in the southwestern part of the state. Its area is approximately 517 square miles (1). Vincennes, the county seat, is about 105 miles southwest of Indianapolis.

Mean annual precipitation is 44.23 inches at Vincennes, 45.94 inches at Decker, and 39.46 inches at Edwardsport (2). An average annual snowfall of about 15 inches can be expected.

Knox County lies wholly within the Wabash Lowland physiographic province of the state (3). In respect to its physiographic situation in the United States it is in the Till Plains section of the Central Lowland province (3).

The surface of Knox County varies from nearly level along the rivers to rolling in the uplands. It is a portion of a glacial plain broken by the valleys of the Wabash and White rivers and their tributaries. Maximum local relief is about 90 feet (3). Sand dunes modify the upland terrain in various places adjacent to the Wabash Valley. The Wabash Valley is broad and gently sloping; relief is less than 50 feet in most parts (4). Dissection is moderate in the uplands in the central part. Some valleys are broad and U-shaped, with gently sloping sides. Most of the upland areas are gently rolling to rolling in relief and they are moderately dissected by streams. A few of the interstream divides are nearly flat areas. The western part of the upland has a dune-like appearance due to deposits of windblown sand (43). Some interstream divides are rounded. Knox County possesses more river boundary than any other county in the state. Several hills of circumalluviation are to be found in the Wabash Valley (4). In places sand dunes modify the surface of the valley floor.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in origin. Bedrock consists of strata of Pennsylvanian age. The formations include sandstones, shales, limestones, and coals. On some of the higher hills sandstone is within five feet of the surface. Rock forms the beds of some streams. Bedrock is nearly always exposed near the bases of the valley braid cores (17). Limestone has been quarried in the northeastern part.

All Knox County was glaciated (3). Illinoian drift covers the bedrock in the uplands when it is not removed by erosion. Terraces containing materials of Wisconsin age are to be found in the Wabash Valley (17). The drift is thin in places. Deposits of valley train materials are about 100 feet thick in the Wabash Valley. There are no moraines present in the county.

The soils of the county have been developed from glacial, residual, aeolian, and water-deposited materials (5)(43). Fox and Warsaw soils occur on the granular deposits. Sand areas have Princeton soils. Loessial soils belong to the Alford catena. Lacustrine soils are of the Otwell catena. Alluvial soils belong to the Genesee and Pope catenas. Muck has been mapped in the bottom land depressions in the southwestern part of the county. Upland subsoils in the eastern part are moderately to slowly permeable (6). Subsoils of the loessial and sandy areas in the west-central part are mostly permeable. River valley subsoils are mostly permeable.

Lacustrine deposits occur along streams entering the White and Wabash rivers (22). Several streams have alluviated valleys. This is probably due to flooded conditions during glacial times. Portions of

nearly all the upland areas have been mapped as being covered with loess (20). These areas include many of the valley braid cores. Lacustrine deposits have in some places been obscured by loess.

Granular deposits occur in the Wabash Valley, mostly in terraces (7). Gravel bars exist in the White River. Areas producing sand and gravel are located north and south of Vincennes in the western part, and along White River in the northeastern part of the county. In the north-west part of the county there are extensive sand dunes on the Wabash Valley floor and upon the upland to the east. There are sand areas on the uplands south of Vincennes. Some of the lakebeds are masked with sand. Wind erosion exists in these areas.

DRAINAGE FEATURES

Knox County lies within two major drainage basins of the state (3). The western half of the county is in the Wabash drainage basin and the remainder is in the White River basin.

Surface drainage is well developed in the upland areas. Many streams have wide valleys. Drainage patterns are relatively fine-textured in the uplands. Flood water flumes mark the bottom lands of the river valleys. Rapids exist in the Wabash River at Grand Rapids. The river flows on rock at this location. The courses of the natural drainageways have been interrupted in several places by strip mining operations. The Wabash and White River valleys acted as glacial sluiceways (18). Their valleys are preglacial and are alluviated. The valley of Maria Creek is an old channel. It extends from the White River valley to the Wabash River valley. Cut-offs in the Wabash River have isolated portions of Indiana and Illinois into island-like tracts. This same condition exists between Daviess and Knox counties in the White River valley.

There are no glacial lakes in the county. Water-filled abandoned meanders are mapped in the White and Wabash valleys. Artificial lakes and ponds of various origins are scattered throughout the area. These include strip mine pits and reservoirs. Swampy areas in the bottom lands have existed.

Many ditches have been constructed in the bottom lands. Streams have been dredged to facilitate drainage.

Stream gaging stations are located on the Wabash River at Vincennes and on the White River at Edwardsport (12).

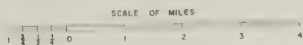
The drainage area of the Wabash River above Vincennes is about 13,930 square miles. This includes several watersheds in Illinois and Ohio; the drainage area of the Wabash in Indiana above White River is about 11,500 square miles (3). The drainage area of White River is about 11,290 square miles. Above Decker it is about 11,230 square miles, and above Edwardsport it is about 5,020 square miles (11). The drainage area of East Fork White River is about 5,680 square miles (11).

Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1952.



DRAINAGE MAP
KNOX COUNTY
INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1952



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

KOSCIUSKO COUNTY

GENERAL NATURE OF THE COUNTY

Kosciusko County is located in the central-northern part of the state. Its area is approximately 538 square miles (1). Warsaw, the county seat, is 105 miles north-northeast of Indianapolis.

Mean annual precipitation is 35.64 inches at Warsaw, and 36.41 inches at Winona Lake (2). An average annual snowfall of at least 30 inches can be expected.

Kosciusko County lies wholly within the Steuben Morainial Lake section of the Northern Moraine and Lake physiographic region of the state (3). In respect to its physiographic situation in the United States it is in the Eastern Lake section of the Central Lowland province (3).

The surface of the county is that of a glaciated plain broken by the valleys of the major streams. It is ridged by moraines and modified by wind and water. Maximum local relief is about 90 feet (3). Two distinct ridges are present in the northeastern part of the county. The outwash plains in the northern part are nearly level. Morainic topography is uneven, being in part subdued in the northeastern corner; in other places it is prominent. Intermorainic areas are gently undulating to nearly level; in the southwestern part they are slightly rolling. Some till plain topography exists in the northeastern part. An undulating tract lies in the vicinity of Milford.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock is mostly of Devonian age. A small area in the southeastern part of the county may have strata of Silurian age, and a small area in the northeastern part may have strata of Mississippian age underlying the drift. There are no known rock outcrops.

All Kosciusko County was glaciated (3). Surface drift is Wisconsin in age. The drift varies in thickness to more than 300 feet. The Packerton moraine covers much of the southern and east-central portions; it crosses the county in a general northeast-southwest direction (10). The Burket, the Bremen, and the New Paris moraines (extending at right angles to the Packerton moraine) are located in the southwest, northwest, and northeast parts of the county respectively. The New Paris moraine contains lake basins.

The soils of the county have been developed from glacial materials (5). Many of the materials have been reworked by wind and water. Upland soils are of the Miami catena. Fox soils occur on the granular deposits. Alluvial soils belong to the Genesee catena. In the southeastern corner subsoils are permeable. Sandy or gravelly areas have very permeable subsoils. River valley subsoils are permeable.

Granular materials are plentiful in almost every part of the county (7). Areas producing sand and gravel occur in various sections of the county. Gravel has been obtained near Warsaw, Claypool, Palestine, Milford Junction, and other places. Knolls of granular material occur

northeast of Warsaw. A granular tract exists near the Barbee lakes. Sandy tracts occur in the northeastern and western parts. These areas are susceptible to wind erosion. A sandy plain lies northwest of Warsaw, another lies south of the Tippecanoe River and west of Warsaw.

DRAINAGE FEATURES

Kosciusko County lies within three major drainage basins of the state (3). The northern part of the county is in the Elkhart subdivision of the St. Joseph drainage basin. A small area in the northwestern corner is in the Kankakee drainage basin. The southeastern corner is in the Eel subdivision of the Wabash drainage basin and the central part of the county is in the Tippecanoe subdivision.

The Tippecanoe River has a low gradient. Its course is meandering. Natural drainage is perhaps best developed along the valleys of the principal streams, although it is weakly developed in most of the county. Outwash plains have excellent internal drainage. Some local watershed divides are broad and nearly level. The divide between the Yellow, Elkhart, and Tippecanoe rivers is relatively flat. A watershed divide exists along the crest of the Packerton moraine. Local divides are defined, at least partially, by the various sections of the other moraines. Though generally haphazard in character, drainage patterns are fine-textured in the morainic areas. Some streams appear to be deflected by the moraines. Turkey Creek crosses a morainic area. Noticeable is the varied direction of flow of tributaries of this stream. Eel River crosses the southeast corner of the county. It flows along the south side of the Packerton moraine.

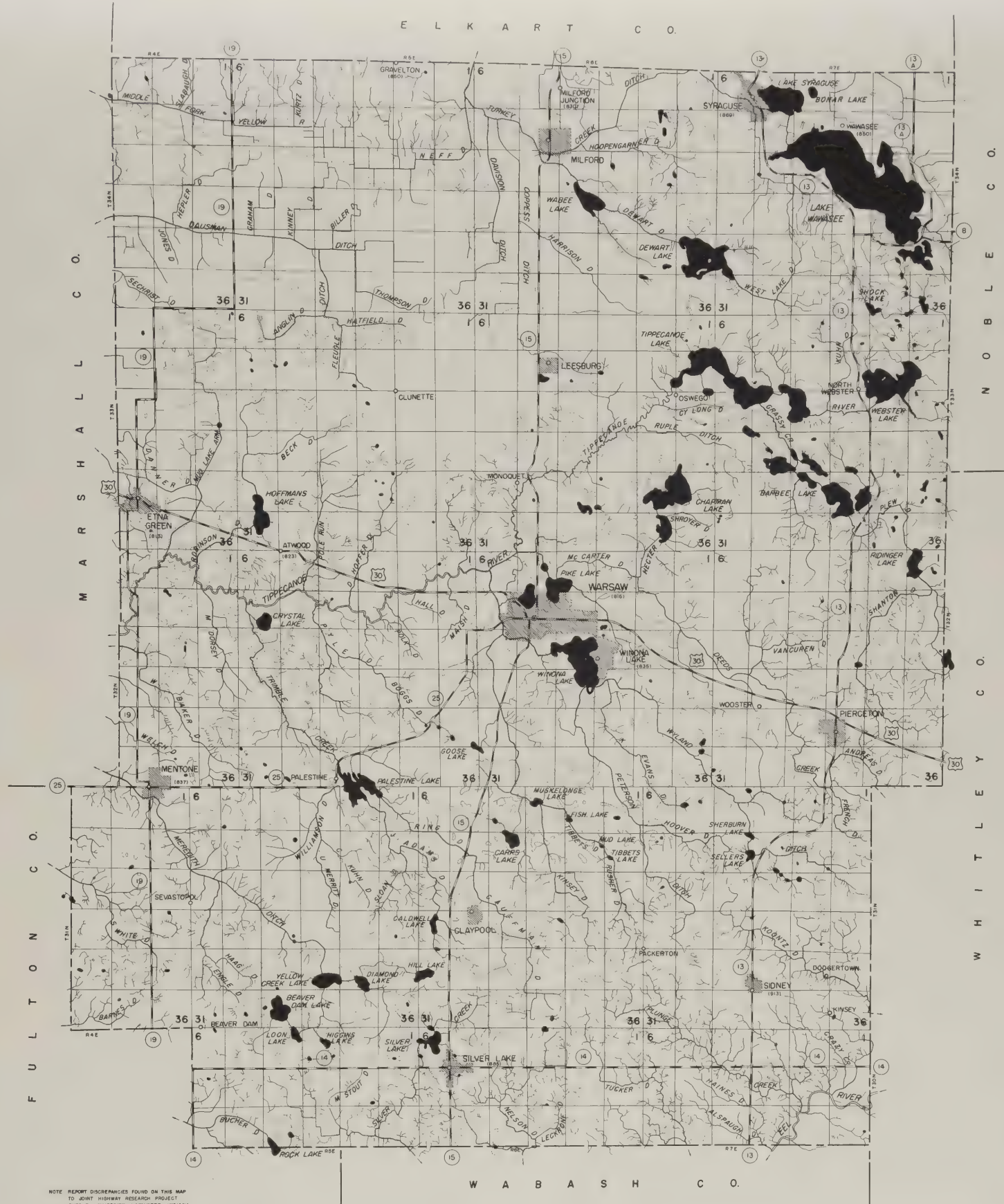
There are a number of lakes in the county. They extend in a rather wide band from the southwest corner to the northeast corner. Ponds of various origins also occur in the area. The lakes have a great variety of size, depth, and outline of shore. Several streams like the Tippecanoe River and Turkey Creek wander from lake to lake. The lakes tend to stabilize the flow of their outlet streams.

Gaging stations are located on Beaver Dam, Carr, Crystal, Dewart, Hoffman, Loon, McClures, Muskelunge, Ridinger, Robinson, Sawmill, Shoe, Silver, Syracuse, Wabee, Wawasee, Webster, Winona, and Yellow Creek lakes (12).

Ditches have been constructed to improve drainage conditions in the several parts of the county. Many streams have been dredged.

A stream gaging station is located on the Tippecanoe River at Warsaw (12). The drainage area of the Tippecanoe River above Warsaw is about 126 square miles (12).

Note: The drainage map was prepared from 1951 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1956.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY LAFAYETTE, INDIANA

DRAINAGE MAP
KOSCIUSKO COUNTY
INDIANA

PREPARED FROM
1951 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1956



LAGRANGE COUNTY

GENERAL NATURE OF THE COUNTY

LaGrange County is located in the northeastern part of the state. Its area is approximately 379 square miles (1). LaGrange, the county seat, is 135 miles northeast of Indianapolis.

Mean annual precipitation is 36.36 inches at Topeka (2). An average annual snowfall of as much as 40 inches can be expected.

LaGrange County lies wholly within the Steuben Morainial Lake section of the Northern Moraine and Lake Physiographic region of the state (3). In respect to its physiographic situation in the United States it is in the Eastern Lake section of the Central Lowland province (3).

The surface of the county is that of a glacial plain broken by the valleys of Pigeon, Fawn, and Little Elkhart rivers and their tributaries. It is ridged by moraines. Maximum local relief is about 100 feet (3). Morainic features are prominent in places. Glacial lakes dot the terrain. Some morainic hills are steep-sided. Near LaGrange and in the northwestern part of the county the moraine is composed of confused groups of dome-shaped or conical hills with interspersed basins of corresponding shape. A conspicuous ridge lies east of LaGrange. Strips of till plain border Little Elkhart River. Outwash plains occur in the northwestern part; local relief is slight in outwash plains.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock consists of strata of Mississippian age. There are no known outcrops of rock in the county.

All LaGrange County was glaciated (3). Surface drift is Wisconsin in age. The drift thickness varies to more than 200 feet. There are four glacial moraines crossing the county (10). The Middlebury moraine is found in the southwestern part of the county. The LaGrange moraine occupies much of the central portion. The Sturgis moraine crosses the northeast corner. Moraines of the Huron-Erie Lobe extend into the southeast corner.

The soils of the county have been derived from glacial materials (5). Many of the materials have been reworked by wind and water. Upland soils belong to the Miami catena. Fox and Warsaw soils occur on the granular deposits. Alluvial soils are of the Genesee catena. Griffin soils occur on outwash plains. In the uplands the subsoils are mostly permeable (6). Sand or gravelly areas have very permeable subsoils. Subsurface "soils" have been found in some parts.

Granular materials seem to be plentiful in most parts of the county (7). Areas producing sand and gravel are extensive in the northern, northeastern, western, and southern parts. Gravel has been obtained near LaGrange, Wolcottville, Shipshewana, and other places. There is

a plain of granular material near the headwaters of Little Elkhart River; others are found in the eastern part of the county, one being near Mongo. There are some sandy areas along Pigeon River. Sandy deposits also have been found in the southwest quarter of the county. In the northeastern part there is a sandy tract with uneven surface.

DRAINAGE FEATURES

LaGrange County lies within the St. Joseph drainage basin of the state, much of the southern part being in the Elkhart subdivision of the basin (3).

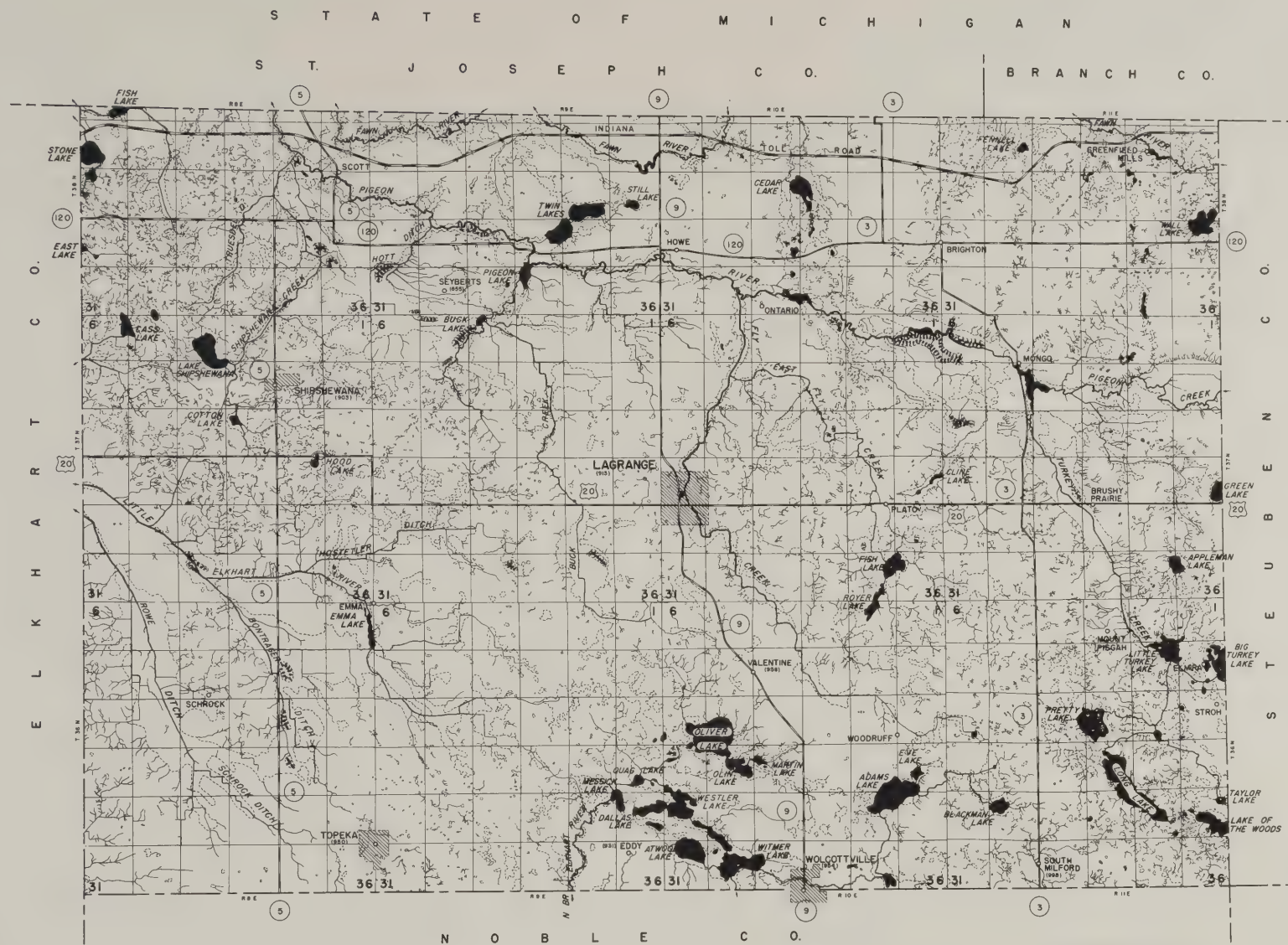
Because of the excellent internal drainage few streams have developed on the granular plain near Topeka. Watershed divides are defined by the crests of sections of moraines in the county. Stream deflection, stream courses, and increased densities of drainage patterns can be attributed, at least partially, to the presence of the moraines in the county. Pigeon River flows on the north side of the LaGrange moraine. Turkey Creek follows a line of glacial drainage. In the southeastern part lake waters find an outlet through the Pigeon River via Turkey Creek. Many of the lakes in the southern part drain through the Elkhart River. Fawn River meanders between Indiana and Michigan. Fawn River and Pigeon River flow from the county to join the St. Joseph River in Michigan. Natural drainage is perhaps best developed along the valleys of the principal streams. Several streams have their sources within the county. With the exception of the central-southern part, the trend of drainage is to the northwest. Some local watershed divides are broad and nearly level.

There are several lakes in the county. They are scattered in the northern part and fairly well grouped in the southern and southeastern parts. In addition, ponds of various origins occur throughout the area. The lakes have a great variety of size, depth, and outline of shore. The lakes tend to stabilize the flow of their outlet streams.

Lake gaging stations are located on Adams, Attwood, Big Turkey, Cedar, Fish, Hackenburg-Messick-Dallas, Little Turkey, Oliver-Olin, Pretty, and Witmer-Westler lakes (12).

Many ditches have been constructed to improve sluggish drainage conditions, an important example being Rowe Ditch which drains the southwest corner of the county.

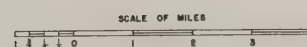
Note: The drainage map was prepared from 1938 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1953.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP LAGRANGE COUNTY INDIANA

PREPARED FROM
1938 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1953



POLYCONIC PROJECTION

DRAWN BY: R. L. DUNHAM

LAKE COUNTY

GENERAL NATURE OF THE COUNTY

Lake County is located in the northwest corner of the state. Its area is approximately 514 square miles (1). Crown Point, the county seat, is 135 miles northwest of Indianapolis.

Mean annual precipitation is 31.07 inches at Hammond, 32.87 inches at Whiting, and 34.29 inches at Hobart (2). An average annual snowfall of at least 30 inches can be expected.

The southern quarter of Lake County lies within the Kankakee Lacustrine section of the Northern Moraine and Lake physiographic region of the state. Of the remainder, the northern half is in the Calumet Lacustrine section and the central part of the county is in the Valparaiso Moraine section of the region (3). In respect to its physiographic situation in the United States the county is in the Eastern Lakes section of the Central Lowland province (3).

The surface of the county is that of a glaciated plain broken by its principal streams, and modified by aeolian and glacio-fluvial action. East of Gary there are high sand dunes adjacent to the Lake Michigan beach. Maximum local relief is about 100 feet (3). Nearly level lakebed portions occur near Lake Michigan. Parts of the Valparaiso moraine are slightly rolling, others are irregular ridges of knolls and basins. A low ridge occurs along the north side of Turkey Creek. Outwash plains border the moraine on the south; these are relatively level. Some low sand dunes are to be found in the Kankakee basin. Gently rolling tracts occur between the ridges of the moraine.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary deposits are both glacial and recent in origin. Bedrock in the northern part of the county consists of strata of Devonian age. In the southern part it is of Silurian age. There are no known outcrops of rock.

All Lake County was glaciated. The drift is Wisconsin in age (3). The drift thickness varies in depth to about 200 feet (8). The Valparaiso moraine crosses the central part of the county in an east-west direction in three more or less distinct ridges (8). It is mostly clay in composition. There is but a slight difference in elevation of the northern and southern borders of the moraine (5). A slight indication of a lake border moraine exists in the presence of a ridge along Turkey Creek (8).

The soils of the county have been developed from glacial materials (5). Much reworking of the materials by wind and water has recurred. Upland soils are of the Miami, Parr, and St. Clair catenas. The Door soils are on the granular deposits. Sand areas have Calumet, Allendale, and Plainfield soils. The Griffin soils are alluvial. Soils of the Lucas catena are lacustrine. Depressed areas contain soils of high organic content. Many are muck and/or peat. Muck exists in channels and basins. In the central part the subsoils are moderately to very slowly permeable depending upon the topography (6). Sandy areas have very permeable subsoils. Some granular materials are found in beach ridges.

Gravel has been obtained near West Creek (7). Areas producing sands and gravels are located in the northern and southern parts. Small areas of sands and gravels are found to a limited extent bordering the Valparaiso moraine in the Kankakee drainage basin. Sandy beach ridges mark the several stages of glacial Lake Chicago (44). Sand comprises

the plains of the Kankakee basin. Some wind erosion exists. Sand masks lakebed deposits in some areas; dunes occur a few miles from present Lake Michigan. The sand is slightly ridged east of Hobart. The Kankakee basin is lacustrine. Lacustrine deposits occur in the northern part, including portions of the Deep River basin.

DRAINAGE FEATURES

Lake County lies within two drainage basins of the state (3). The northern half of the county is in the Calumet basin and the southern half is in the Kankakee basin.

Lake Michigan borders the county on the north. Streams draining southward interrupt the continuity of the moraine. Before joining the Kankakee River, Singleton Ditch flows into Illinois. Most of the drainage in the southern part is into Illinois. Formerly the natural outlet of the Calumet River system was into Lake Michigan near Miller Beach (19). Now, that outlet is closed and dredged channels connect the system to the lake in both Lake and Porter counties and to the Des Plaines River in Illinois. Direction of flow depends upon flood conditions in the various parts of the system. The Calumet River normally is a very sluggish stream, having a shallow channel and a very low gradient; it resembles a canal. The Kankakee River Ditch has a very low gradient. Erosion on the sand dunes is reduced to a minimum. Swampy areas border the Kankakee River. These areas contain abandoned meanders of the river. Natural drainage is perhaps best developed along Deep River. Deep River is somewhat entrenched in parts of its course. Outwash plains have excellent internal drainage; therefore, natural surface drainage is weakly developed. Some basins occur. A watershed divide extends in an east-west direction through the center of the county. The extent of the Valparaiso moraine can be approximately determined by the fine-textured drainage pattern of the central portion of the county. Local watershed divides, stream deflections and the increased densities of the drainage patterns can be attributed, at least partially, to the presence of the moraine. Deep River and other principal streams cross portions of the moraine. Slight depressions separate beach ridges near the lake. Artificial waterways dominate the lowlands north and south of the moraine. Abrupt changes in the course of Deep River are noticeable. Many local watershed divides are broad and nearly level.

There are several natural lakes in the county, of which Cedar Lake is the largest. Ponds of various origins are scattered over the area. The lakes tend to stabilize the flow of their outlet streams. Gaging stations are located on Dalecarlia and Cedar lakes (12).

Numerous dredged ditches form veritable networks in the nearly level sections of the county. The Kankakee River was dredged to drain the former Lake Kankakee. Remnants of the old stream exist in the many oxbows near the present channel.

Stream gaging stations are located on the Calumet River system near Gary, on Hart Ditch at Munster, on Deep River at Hobart, on West Creek near Schneider, and on Singleton Ditch near Schneider (12). The drainage area of Deep River above Hobart is about 124 square miles (12).

Note: The drainage map was prepared from 1938 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1949.

S T A T E O F I N D I A N A



DRAINAGE MAP LAKE COUNTY INDIANA

PREPARED FROM
1938 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1949



POLYCONIC PROJECTION

LA PORTE COUNTY

GENERAL NATURE OF THE COUNTY

LaPorte County is located in the northwestern part of the state. Its area is approximately 608 square miles (1). LaPorte, the county seat, is 130 miles northwest of Indianapolis.

Mean annual precipitation is 39.14 inches at LaPorte (2). Average annual snowfall is about 50 inches.

The northwestern tenth of LaPorte County lies within the Calumet Lacustrine section of the Northern Moraine and Lake physiographic region of the state (3). The southeastern half is in the Kankakee Lacustrine section, and the remainder is in the Valparaiso Moraine section of the region. In respect to its physiographic situation in the United States the county is in the Eastern Lake section of the Central Lowland province (3).

The surface of LaPorte County is that of a glaciated plain dissected by the major streams and ridged by morainic deposits. Southeast of the coastal beach is a nearly continuous band of high sand dunes which parallels the lake shore. Maximum local relief is about 150 feet (3). The Valparaiso moraine is quite rolling; the knolls rise rather sharply with fairly steep slopes. Local relief is slight in most of the outwash plains. Occasional low sand dunes occur in the southern part of the county. The highest elevation on the moraine is near LaPorte. Ridges exist southeast of Michigan City. There is a pitted and stream-dissected plain area east of the Little Kankakee River (45). The Kankakee Valley is rather wide with gently sloping sides; it is very shallow.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary deposits are both Pleistocene and recent in age. Bedrock in the county consists of strata of Devonian age. There are no known rock outcrops in the county.

All LaPorte County was glaciated (3). Glacial drift is of Wisconsin age. The drift thickness varies to nearly 300 feet (9). The stream systems have been developed in these deposits. Seemingly they have not been affected by the underlying rock. LaPorte County is crossed by the massive Valparaiso moraine extending in a northeast-southwest direction across the northwest third of the county (9). Lesser ridges are near the lake and have been considered lake border moraines. The Valparaiso moraine rises rapidly to LaPorte from the west and maintains its altitude eastward (9).

Soils have been developed from glacial materials (5)(45). Much of this material was reworked by wind or water before the soils were formed. Upland areas have soils of the Nappanee and Brookston catenas. The most extensive soil in the county is of the Door catena; it is developed on the outwash plains. Tracy soils are outwash plain soils, also. Plainfield, Bridgman, and Berrien soils are developed on the dunes and beach deposits of sands. Lacustrine soils belong to the Lucas catena. Alluvial areas have Griffin soils. Soils of high organic content occur in the depressions. Mucks and peat have been mapped extensively. Subsoils in the morainic sections vary from permeable to slowly permeable (6). Areas of sandy or gravelly materials have very permeable subsoils.

There is some granular material in the Valparaiso moraine and in beach ridges (7). Areas producing sands and gravels are located in the eastern, northwestern, and southwestern parts. Granular outwash plains exist in the southeast part. The sand areas have some wind erosion. Sand dunes exist along Lake Michigan as well as a few miles inland from the shore. Sand plains occur in the southern part; the Kankakee basin is mostly a lacustrine sand plain. Lakebed areas occur in the northwestern part, including the Trail Creek Valley. Some peat is found under sand in portions of old beach ridges.

DRAINAGE FEATURES

LaPorte County lies within two drainage basins of the state (3). The northwestern part is in the Calumet basin and the remainder (the central and southern parts) is in the Kankakee basin.

Lake Michigan borders the county on the northwest. The Kankakee River Ditch has a very low gradient. The Valparaiso moraine can be outlined by its fine-textured drainage pattern. Trail Creek drains an area directly into Lake Michigan. The moraine acts as a divide between streams flowing toward Lake Michigan and the Kankakee River. In the central-northern part, several streams drain into the state of Michigan. The outwash plain can be more or less outlined by long, nearly parallel streams flowing south and southeast to the Kankakee River; stream valleys are usually narrow. A glacial drainage channel seems to have existed between Galina Creek and the Little Calumet River. Trail Creek crosses a morainic ridge southeast of Michigan City. Natural drainage is perhaps best developed along the streams flowing northwest from the Valparaiso moraine. On the whole natural drainage is weakly developed. Stream valleys are shallow in the outwash plain area. Some basins exist. Streams in the Valparaiso moraine have V-shaped valleys with narrow bottoms and steeply sloping sides. Many of them form near the south side of the moraine and flow northwestward. Headwater streams of Trail Creek flow nearly parallel to the Lake Michigan shore due to morainic ridges. Erosion on the sand dunes is reduced to a minimum.

There are a number of lakes in the county. Ponds of various origins are scattered throughout the area. Many of these occur in the moraine in the northeastern part. Lakes tend to stabilize the flow of their outlet streams. The lakes have a great variety of size, depth, and outline of shore. Gaging stations are located on Hudson, Fish, Pine, Saugany, and Stone Lakes (12).

An extensive system of ditches, including the Kankakee River Ditch, is to be found in the county. Remnants of the old stream exist in the many oxbows near the present channel.

A stream gaging station is located at Davis on the Kankakee River (12).

Note: The drainage map was prepared from 1939 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1949.



PREPARED FROM
1939 AAA AERIAL PHOTOGRAPHS
BY
STATE HIGHWAY COMMISSION OF INDIANA
AT
PURDUE UNIVERSITY
1949

NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

SCALE OF MILES



LAWRENCE COUNTY

GENERAL NATURE OF THE COUNTY

Lawrence County is located in the south-central part of the state. Its area is approximately 459 square miles (1). Bedford, the county seat, is 65 miles south-southwest of Indianapolis.

Mean annual precipitation is 41.65 inches near Oolitic (2). An average annual snowfall of about 20 inches can be expected.

Lawrence County lies within three physiographic regions of the state. Progressively from east to west, these are: The Norman Upland, the Mitchell Plain, and the Crawford Upland (3). In respect to its physiographic situation in the United States, the county is in the Highland Rim Plateau section of the Interior Low Plateaus province (3).

The surface of the county varies from the sinkhole pitted limestone plains to the rather rugged sandstone highlands dissected by the major streams and their tributaries. Maximum local relief is about 350 feet (3). The central region north of White River is hilly. The western and southwestern parts are rough and broken. The uplands in the eastern and northeastern parts are undulating. Isolated hills are present in the White River Valley. Karst topography prevails over many square miles. Streamless, or semi-streamless, valleys exist in various sections.

The surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock consists, in most of the county, of strata of Mississippian age. There are small areas in the western and southwestern parts where the uppermost strata are of Pennsylvanian age. The rocks outcrop in nearly all parts of the county. Coal outcrops in the southwest part of the county. Limestones are quarried extensively in the central part. In the northeastern part ridges may be capped with limestone. North-south faults cross the eastern part.

Lawrence County is in the unglaciated region of the state (3). Glacial materials exist in the deposits along East Fork White River and Salt Creek because these streams acted as glacial sluiceways (22).

Soils of the county have been derived from residual materials (5). Sandstone-shale soils belong to the Zanesville catena. Limestone soils belong to the Hagerstown and Frederick catenas. Alluvial soils are of the Genesee, Huntington, and Pope catenas. In most of the central part of the county the subsoils are moderately to slowly permeable (6). Areas in the northeastern corner and along the western side have slowly permeable subsoils. River valley subsoils are mostly permeable.

Gravel bars occur in White River (7). Deposits of bedrock fragments are found in many of the streams. Leatherwood Creek, for example. Areas producing sands and gravels are located in the central part. Alluvial soils contain deposits of sand, usually in streaks and ridges.

Lacustrine deposits occur along streams entering East Fork White River (22).

DRAINAGE FEATURES

Lawrence County lies wholly within the East Fork subdivision of the White River drainage basin of the state (3).

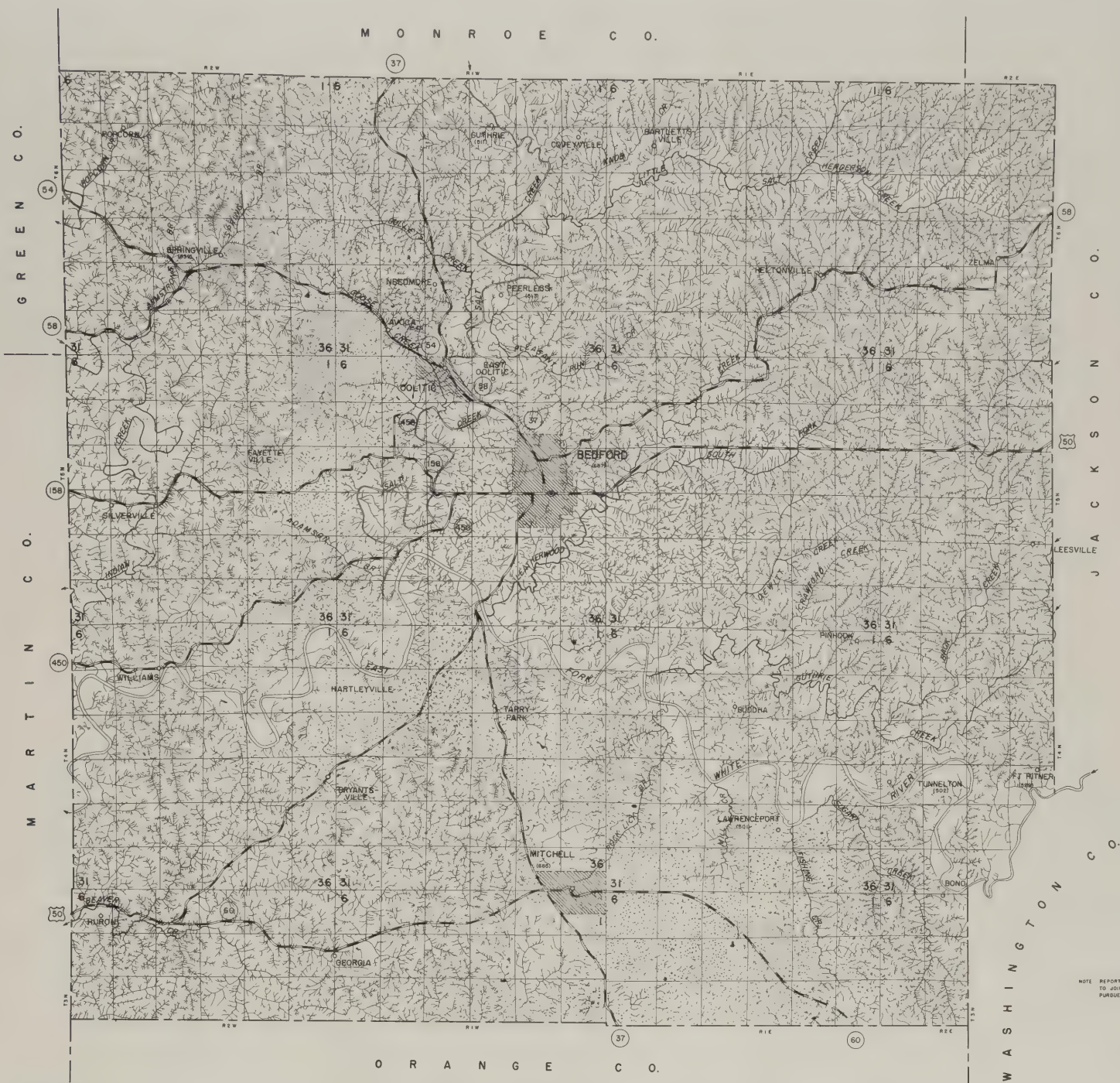
Streams passing through the Crawford Upland have meandering courses. The East Fork White River Valley is gorge-like, being rather narrow through the county. The river is very meandering. Likewise, Indian and Salt Creeks show the effects of rock control in their meandering north-south courses. Indian Creek has a subterranean cutoff in the western part of the county. The courses of natural drainageways have been interrupted by quarrying operations in the central part of the county. Drainage patterns are associated with bedrock types and topography. Guthrie Creek nearly parallels East Fork White River for several miles above their junction. Drainage systems are well developed in the Norman Upland portion of the county. Here the drainage patterns are relatively fine-textured. Subterranean drainage is developed extensively throughout the limestone regions. Springs are common along the major streams. Streamless valleys (e.g., Beaver Valley) occur in the western part of the county. Few surface streams cross karst areas. Very few streams enter East Fork White River from the south. There is a low area connecting the valley of Crooked Creek to the valley of East Fork White River.

There are no natural lakes in the county. Ponds of various origins are scattered over the area.

Ditches have been constructed where necessary.

Stream gaging stations are located near Bedford and at Williams on East Fork White River, and on Salt Creek at Peerless (12). The drainage area of East Fork White River above Bedford is about 4,000 square miles, and that of Salt Creek above Peerless about 609 square miles (12).

Note: The drainage map was prepared from 1938 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1953.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP TO JOINT HIGHWAY RESEARCH PROJECT, PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP LAWRENCE COUNTY INDIANA

PREPARED FROM
1938 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1953



MADISON COUNTY

GENERAL NATURE OF THE COUNTY

Madison County is located in the north-central part of the state. Its area is approximately 453 square miles (1). Anderson, the county seat, is 35 miles northeast of Indianapolis.

Mean annual precipitation is 37.96 inches at Anderson (2). An average annual snowfall of about 25 inches can be expected.

Madison County lies wholly within the Tipton Till physiographic region of the state (3). In respect to its physiographic situation in the United States it is in the Till Plains section of the Central Lowland province (3).

The surface of the county is that of a glacial plain broken by the valleys of White River and its tributaries. It varies from nearly level to slightly undulating. A weakly developed moraine adds to these undulations. Maximum local relief is about 70 feet (3). Morainic topography is somewhat rolling. This includes some ridges. Intermorainic areas are gently rolling. Channels of glacial drainage occur in various parts of the county. Local basins are found in various areas. An abandoned channel crosses the county from Grant to Shelby counties. An undulating area is located north of Fall Creek in the southeastern part of the county.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock consists, in most of the county, of strata of Silurian age. There is a small area in the southwestern corner where the uppermost strata are of Devonian age. Several rock outcrops occur in the stream valleys of the southern part of the county but few are to be found in the northern part. Limestone has been quarried along Stoney Creek, at Alexandria, and west of Anderson. Shale has been quarried near Frankton. Sandstone occurs in Fall Creek at Pendleton.

All Madison County was glaciated (3). Surface drift is Wisconsin in age. The drift varies in thickness from a few feet to as much as 150 feet. It is presumably deepest in the preglacial Anderson Valley. The Union City moraine crosses the northeast corner of the county in a northwest-southeast direction. It is only a slightly undulating ridge.

The soils of Madison County have been developed largely from glacial materials (5). Some of the materials have been reworked by water. For the most part upland soils are of the Miami catena. Fox soils have developed on granular deposits. Bottom land soils belong to the Genesee catena. Clyde soils occur in the depressions. Organic soils are mucks and peat. Subsoils are moderately permeable in sloping areas and slowly permeable in depressions and nearly level sections (6).

Granular materials are located in the White River, and such other streams as Killbuck, Fall, and Pipe creeks (7). Gravel has been found, also, in morainic ridges and hills and old filled valleys. Areas producing sands and gravels occur in the north-central, central, central-southern, and southwestern parts. This includes the Anderson esker. Sand banks are occasionally found along drainage channels.

DRAINAGE FEATURES

Madison County lies within two major drainage basins of the state, the Wabash and the White (3). The northwestern corner is in the Wildcat subdivision and the northeastern corner is in the Mississinewa subdivision of the Wabash basin. The southeast corner is in the East Fork subdivision and the remainder is in the White River basin proper.

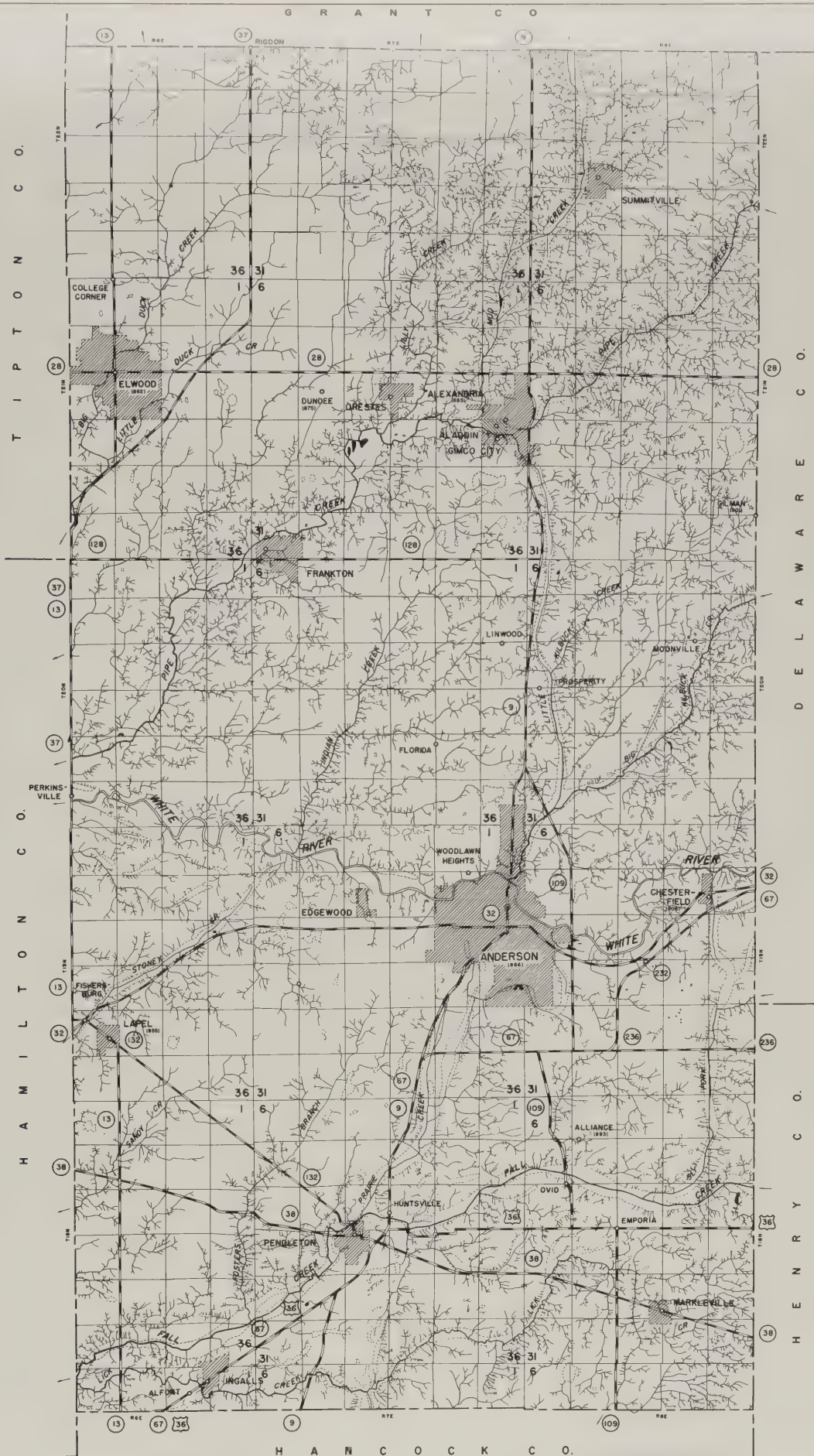
Natural drainage is best developed along the valleys of White River and other principal streams of the county. Some watershed divides are broad and nearly level. The presence of a section of moraine in the northeastern part of the county has had some effect on establishing local watershed divides. Pipe Creek crosses the moraine. Some increase in densities of drainage patterns occurs. There is some local control over stream courses, and some stream deflections can be attributed, at least partially, to the moraine. Drainage pattern densities conform to topography and surface materials in morainic areas. Streams in the northern part have a nearly parallel southwestern trend. Noticeable are the abrupt changes in the course of Lick Creek near Markleville. The trend of drainage is westerly. Falls exist in Fall Creek at Pendleton. Killbuck, Pipe, and Buck creeks have broad valleys; this is true of White River west of Anderson. Prairie Creek flows in a glacial meltwater channel. Streams are widely spaced in the northwestern and southwestern parts. Streams are rather insignificant in the glacial sluiceways.

There are no natural lakes in the county. Ponds of various origins are scattered throughout the area.

Ditches have been constructed where necessary to improve sluggish drainage conditions.

Stream gaging stations are located on White River at Anderson and Fall Creek near Fortville (12). The drainage area of White River above Anderson is about 543 square miles (11).

Note: The drainage map was prepared from 1939 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1954.



DRAINAGE MAP MADISON COUNTY INDIANA

PREPARED FROM
1939 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1954



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

MARION COUNTY

GENERAL NATURE OF THE COUNTY

Marion County is the central county of the state. Its area is approximately 402 square miles (1). Indianapolis, the state capital, is also the county seat.

Mean annual precipitation is 39.90 inches at Indianapolis, and 39.80 inches at Oaklandon (2). An average annual snowfall of more than 20 inches can be expected.

Marion County lies wholly within the Tipton Till Plain physiographic region of the state (3). In respect to its physiographic situation in the United States, it is in the Till Plains section of the Central Lowland province (3).

The surface of the county is that of a glacial plain. It is broken by the valleys of White River and its tributaries. Morainic ridges are integral portions of the terrain. Maximum local relief is about 125 feet (3). Morainic topography is somewhat pronounced in the southeastern part where the land is undulating. Bottom lands along White River are fairly level, with only slight undulations. The ground is quite rolling along Eagle Creek. Fall Creek also flows through limited areas of rolling country. Some rather high knolls lie east of White River in the northern part of Indianapolis. A conspicuous knoll lies in the southwestern part on the west side of White River; there is another one northeast of Glen Valley. There are several distinct knolls in the southeastern part. Ridges occur along Little Buck Creek.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both glacial and recent in age. Bedrock consists, in most of the county, of strata of Devonian age. There is a small area in the southwest corner where the uppermost strata are of Mississippian age. There apparently are no outcrops of the bedrock.

All Marion County was glaciated (3). Surface drift is Wisconsin in age. The drift is as much as 200 feet thick in some areas. It varies according to the preglacial bedrock topography. Ridges of the Bloomington morainic system cross the county (10). One ridge is intermittent between the northwest corner and its crossing at the central part of the south county line. Another more or less continuous ridge extends between the center of the north county line and the east quarter point on the south boundary. A small area in the eastern part of the county also belongs to the same morainic system. Materials of glacial origin are relatively deep in the White River valley.

The soils of Marion County were developed from glacial materials, some of which have been reworked by water (5). Upland soils belong to the Miami catena. Fox soils are found on the terraces and Bellefontaine soils occur on the granular knolls. Alluvial soils are of the Genesee catena. Upland area subsoils are slowly to moderately permeable (6). River valley subsoils are mostly permeable. Muck has been mapped in limited areas only. Many of the depressions contain soils high in organic matter.

Granular deposits have been found along most of the major streams (7). They occur in the river terraces, and in morainic knolls and ridges. Areas producing sand and gravel are located along White River and Fall

Creek. They are also to be found in the central-western and northwestern parts of the county. Gravel has been found along Eagle Creek, Fishback Creek, Crooked Creek, Indian Creek, Pleasant Run, Grass Creek, and East Lick Creek. Subsurface deposits of granular materials exist. Granular materials have been found in the area between White River and Eagle Creek. Sand streaks occur in the alluvial areas.

DRAINAGE FEATURES

Marion County lies entirely within the White River drainage basin of the state, the southeast corner being in the East Fork subdivision of the basin (3).

White River acted as a glacial sluiceway. This is evidenced by the granular nature of the valley deposits. Sugar Creek valley south of Acton is also a glacial sluiceway. The White River Valley is rather broad and fairly deep, especially in the southern part of the county. North of Indianapolis the Fall Creek Valley is wide. A portion of the Old Central Canal is still in use in Indianapolis. Natural drainage is best developed along the valleys of the White River and the principal streams of the county. White River has a meandering course. The course of Fall Creek may have been influenced by the moraine. Some local watershed divides are broad and nearly level. The crests of sections of moraines in the county define local watershed divides. Courses of streams and stream deflections have been affected, at least partially, by the moraine. Irregularities in drainage patterns occur in the moraine. Large streams, such as White River, Eagle Creek, and Fall Creek cross the moraine. The abrupt changes in the course of Indian Creek are noticeable. Crooked Creek shows minor deflections. Buck Creek flows in a southerly direction. Fall Creek shows some deflection in the White River valley, probably due to the granular terrace. A few short streams enter White River from the west in the southwest corner of the county. North-south watershed divides extend northward in the southwest and southeast corner.

There are no natural lakes in the county. Water-supply reservoirs, artificial lakes, and ponds of various origins are to be found within the area. Geist reservoir is an example of the former. Abandoned meander oxbow lakes occur in the White River valley.

Ditches have been constructed to improve sluggish drainage conditions in low-lying areas.

Stream gaging stations are located on White River near Nora and at Indianapolis, on Fall Creek near Millersville, and on Eagle Creek at Indianapolis (12).

The drainage area of the White River above Indianapolis is about 1,605 square miles (11).

Note: The drainage map was prepared from 1941 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1947.

MARSHALL COUNTY

GENERAL NATURE OF THE COUNTY

Marshall County is in the central-northern part of the state. Its area is approximately 444 square miles (1). Plymouth, the county seat, is 110 miles north-northwest of Indianapolis.

Mean annual precipitation is 34.79 inches at Plymouth (2). An average annual snowfall of at least 30 inches can be expected.

Most of Marshall County lies within the Steuben Morainal Lake section of the Northern Moraine and Lake physiographic region of the state. The extreme western part, however, is in the Kankakee Lacustrine section of the region (3). In respect to its physiographic situation in the United States, the county is in the Eastern Lake section of the Central Lowland province (3).

The surface of the county is that of a glacial plain broken by the valleys of the Yellow and Tippecanoe rivers and their tributaries. It has been modified by wind and water action. Maximum local relief is about 100 feet (3). Morainic topography is uneven. There are some high morainic knolls west of Plymouth. Intermorainic areas are nearly level to gently rolling. A rather well defined ridge exists north of the Tippecanoe River. Outwash plains are but slightly rolling with some surface drainage development.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock consists of strata of Devonian age. The formations are composed of shales and limestones. No known outcrops of bedrock exist.

All Marshall County was glaciated (3). Surface drift is Wisconsin in age. The drift varies in thickness, according to the preglacial topography; it is as much as 250 feet thick in places. Sections of the Maxinkuckee moraine cover portions of the western and southern parts of the county (3). Intermittent ridges of the Bremen moraine cross the northeastern corner. The former is prominent along the western edge of the county and is broadest near Lake Maxinkuckee. The moraine rises abruptly from the plain along its western side, and knolls are high west of Plymouth.

Soils of the county have been derived from glacial materials (5). Many of the materials have been reworked by wind and water. Upland soils belong to the Miami and Galena catenas. Sandy soils belong to the Plainfield-Berrien-Newton catena. Also included are Oshtemo soils and soils of the Metea catena. Fox and Westland soils occur on the granular desposits. Tracy soils occur, also. Alluvial soils are of the Genesee catena. Maumee soils are found in depressions. Organic soils are mucks and peat. The subsoils of the county vary from permeable to very permeable depending upon the nature of their texture and structure and upon topography (6).

Knolls of granular materials occur in some parts including the southwest corner of the county (7). Gravel has been obtained near Plymouth, Culver, Argos, and other places. Yellow River flows through a plain of

granular material. Areas producing sands and gravels are located in the southwestern, northwestern, and southeastern parts. Subsurface gravel deposits occur in some places. North of Yellow River, near Plymouth, is a plain of granular material. Outwash plains are found southwest of the Bremen moraine. Much sand is to be found in Marshall County (10). Sand plains and dunes occupy considerable areas.

DRAINAGE FEATURES

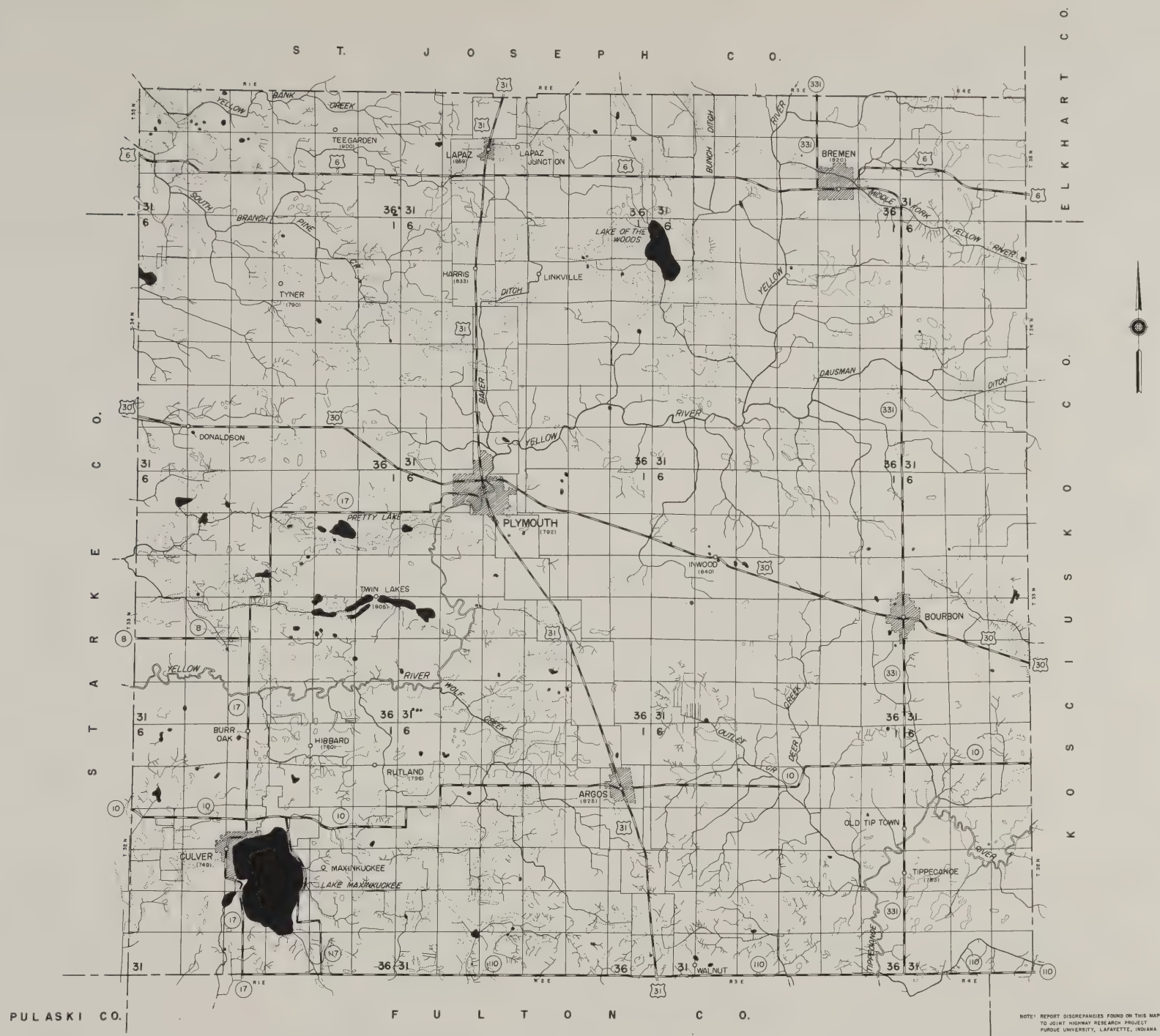
Marshall County lies within two major drainage basins of the state (3). The southeastern quarter is in the Tippecanoe subdivision of the Wabash drainage basin and the remainder of the county is in the Kankakee drainage basin.

The Tippecanoe River has a low gradient. Likewise, Yellow River has a low gradient in its upper reaches and in the central part of the county. Natural drainage is best developed along the principal streams, although it is weakly developed over most of the county. The Tippecanoe River meanders in and out of the southeast corner. Its course is rather abruptly deflected. Crests of sections of moraines define local watershed divides. Courses of streams and stream deflections have been affected, at least partially, by the presence of the moraines. Wolf Creek is deflected. Yellow River flows through morainic areas. Drainage pattern densities appear to be controlled by surface materials and surface features. Streams meander in many directions. The distinctive bends in Yellow River are prominent. Noticeable also are the curving courses of Pine Creek and its tributaries, including Yellow Bank Creek. Many local watershed divides are broad and nearly level. Water erosion of sand dunes is reduced to a minimum. Eagle Creek has its source in the lakes of the central-western part of the county.

There are several glacial lakes in the county. Numerous ponds of various origins are scattered over the area. The lakes act to stabilize the flow of their outlet streams. Most lakes occur in the morainic area in the western part. The lakes have a great variety of size, depth and outline of shore. Gaging stations are located on Lake of the Woods, on Maxinkuckee Lake, Mill Pond Lake, and Myers Lake (12). Ditches have been constructed to improve sluggish drainage conditions. Streams have been dredged.

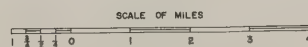
A stream gaging station is located on the Yellow River at Plymouth (12). The drainage area of Yellow River above Plymouth is about 280 square miles (12).

Note: The drainage map was prepared from 1951 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1956.



DRAINAGE MAP MARSHALL COUNTY INDIANA

PREPARED FROM
1951 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1956



POLYCONIC PROJECTION

DRAWN BY: H. Y. FANG

MARTIN COUNTY

GENERAL NATURE OF THE COUNTY

Martin County is located in the southwestern part of the state. Its area is approximately 345 square miles (1). Shoals, the county seat, is 85 miles southwest of Indianapolis.

Average annual precipitation is 42.15 inches at Shoals (2). Snowfall is not expected to exceed 15 inches annually.

Most of Martin County lies within the Crawford Upland physiographic region of the state. Only a small area in its central-western part is in the Wabash Lowland (3). In respect to its physiographic situation in the United States, the Crawford Upland portion of the county is in the Interior Low Plateaus province and the Wabash Lowland portion is in the Till Plains section of the Central Lowland province (3).

The uplands of Martin County are quite hilly. The surface is that of a stream dissected plain. The hills are both high and low; the ridges both sharp and rounded; the valleys both V-shaped and U-shaped. Glaciation has smoothed the western part to a certain extent. East Fork White River is deeply entrenched through most of the county. Maximum local relief is about 300 feet (3). The highest point is in the eastern part and the lowest is in the southwestern corner. Sandstone bluffs are prominent near Shoals. Sand dunes in the county are irregularly rolling. Rock benches occur on the valley slopes in many parts, valley walls are steep in other places. A few sinkholes pit the terrain in some places in the eastern part. Ridges are broad in the western part and valleys are rather wide. A nearly continuous residual ridge lies between Indian and Boggs creeks. South and east of White River lies a rather highly dissected area; ridges are narrow. Shale strata present a step-type topography in some areas. Isolated hills are present in the East Fork White River valley.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. In the central-eastern part of the county, bedrock consists of strata of Mississippian age. Bedrock in the remainder of the county is of Pennsylvanian age. Limestone outcrops in the eastern part. Exposures of sandstone occur in the central part. Sandstones form steep bluffs in some areas. Sandstone in the vicinity of Shoals is massive. The "Coal Measures" rocks are in the western part; these rocks are more or less non-resistant to weathering agencies.

A band along the western edge of the county, only, was glaciated; Illinoian drift is the surface material except where it has been eroded (3). The drift is thin in most places and the border indistinct in many places. There apparently is no indication of the existence of moraines.

The soils of the county have been derived from glacial, residual, aeolian and alluvial materials (5)(46). Illinoian drift soils belong to the Cincinnati catena. Sandstone soils are of the Zanesville catena. Limestone soils belong to the Frederick catena. Fox soils occur on the granular deposits. Sand areas have Princeton soils. Alluvial soils are of the Genesee and Pope catenas. A few depressions have soils of high organic content. Most of the county has subsoils which are slowly permeable (6). They may vary to very slowly permeable along the western side. River valley subsoils are mostly permeable.

There is little granular material of glacial origin in the county, although some is found in the western part (7). Granular materials composed of quartz pebbles from the Mansfield sandstone are available in certain parts of the county. Cherty gravels are found on the tops of some of the hills. Deposits of fragments of local bedrock occur in many of the small stream valleys. Deposits of sand are scattered along the eastern bluffs of the White River valley. Small lakebed areas exist along the glacial boundary, particularly in the vicinity of Loogootee and in the northwest corner of the county. Lacustrine deposits are to be found along some streams entering East Fork White River (46). The lower valley of Indian Creek and the valleys of Flat and Beach Creek appear to be aggraded.

DRAINAGE FEATURES

The extreme southeastern corner of the county is in the Patoka River drainage basin of the state (3). The remainder of the county is included in the White River drainage basin -- the central part is drained by East Fork White River and the northwestern part drains to White River through Furse Creek (3).

Principal streams of the area are entrenched and meander through narrow channels. Surface drainage systems are well-developed in the upland areas, there being but little level land remaining. The general trend of drainage is to the southwest. Streams crossing the Crawford Upland are entrenched and especially meandering. Many streams flow on rock in portions of their courses. The bedrock has exerted its control on the courses of the principal streams for many sharp bends occur throughout their lengths. Indian Creek and Lost River are very meandering; they are entrenched in rock. The East Fork White valley is gorge-like in places. Its lower part is aggraded. The valley varies in width from place to place. Beaver Creek in its meandering course shows rock control. Falls exist in the East Fork White River at Hindostan. Fine-textured drainage patterns occur in most of the uplands. Drainage is integrated in many of the upland areas. East Fork White River acted as a glacial sluiceway. This stream in the north-south portion of its course appears to be a strike stream. The course of Furse Creek appears to have been affected by glaciation; it has been deflected southward near the glacial boundary (9). Plaster Creek, in its upper reaches, flows nearly parallel to the glacial boundary; its course appears to have been influenced by glaciation.

Greenwood Lake has been formed by the damming of Furse Creek, Ponds of various origins are scattered throughout the area. Runoff is rapid in many upland areas, resulting in erosion.

Few ditches are needed to improve drainage conditions. Some low gradient streams have been dredged.

A stream gaging station is located at Shoals on the East Fork White River (12).

The drainage area of East Fork White River above Shoals is about 4,940 square miles (11).

Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1948.

GREENE CO.

DAVIESS CO.

LAWRENCE CO.

ORANGE CO.

DUBOIS CO.

DRAINAGE MAP MARTIN COUNTY INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
STATE HIGHWAY COMMISSION OF INDIANA
AT
PURDUE UNIVERSITY
1948

NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

SCALE OF MILES
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POLYCONIC PROJECTION

MIAMI COUNTY

GENERAL NATURE OF THE COUNTY

Miami County is in the north-central part of the state. Its area is approximately 380 square miles (1). Peru, the county seat, is 75 miles north-northeast of Indianapolis.

From data collected in surrounding counties, mean annual precipitation should be from 37 to 38 inches (2). An average of more than 25 inches of snow can be expected annually.

The southern half of Miami County lies within the Tipton Till Plain physiographic region of the state, and the northern half is a part of the Steuben Morainal Lake section of the Northern Moraine and Lake region (3). In respect to its physiographic situation in the United States, the southern half is in the Till Plains section, and the northern half is in the Eastern Lake section of the Central Lowland province (3).

The surface of the county is that of a glacial plain. It is broken by the valleys of the Wabash, Eel, and Mississinewa rivers and their tributaries. It is ridged by two moraines. Maximum local relief is about 100 feet (3). Rock ridges and dome-like hills occur in the Wabash valley. A mid-valley ridge in the Wabash Valley extends west from Peru into Cass County. Morainic topography in the northern part of the county is the sag-and-swell type, with few basins. It is prominent in places. The southern part is gently undulating except in the vicinity of the main streams. East of Peru the Wabash Valley is quite wide; although its actual flood plain is somewhat narrow. Sandy areas have dunes and ridges.

The surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock consists of strata of Silurian age. Rock outcrops in many parts of the Wabash Valley; there are also occasional outcrops in the Mississinewa River and Big Pipe Creek valleys, limestone outcrops in Peru (30).

All Miami County was glaciated. Surface drift is Wisconsin in age (3). The drift is 300 feet or more thick in places; it varies according to the preglacial topography. It is deepest in the subsurface valley of the preglacial Teays River. The county is traversed by sections of three moraines (3). The Union City moraine extends from near the center of the south county line to near the center of the west county line; it is slightly rolling. The Packerton moraine covers much of the northern part, crossing in a northeast-southwest direction; it is generally massive. It is joined in the extreme northwest corner by the northwest-southeast Rochester moraine which has a somewhat rolling surface.

The soils of the county have been derived from glacial materials (5). Some of these materials have been reworked by water. Underlying rock has had no appreciable influence on their development. Upland soils belong to the St. Clair and Miami catenas. Fox soils are found on the granular deposits. Alluvial soils are of the Genesee catena. Organic soils are muck. In the northern third of the county subsoils are mostly permeable (6). In the central and southern parts they vary from moderately to slowly permeable depending upon the topography. River valley subsoils are very permeable.

Granular materials have been found in the northwestern part (7). Morainic knolls contain some gravel in the northern part (10). Some of the streams in the southern part have exposed gravel in their valley walls.

Granular terraces exist in the Wabash and Eel River valleys. Areas producing sands and gravels are found to be extensive in the central, southwestern, northern and eastern parts. There are a few dune-like sand ridges in the Eel River valley; extensive sand areas are found in the northern part.

DRAINAGE FEATURES

Miami County lies wholly within the Wabash drainage basin of the state (3). A main subdivision is the Eel River basin.

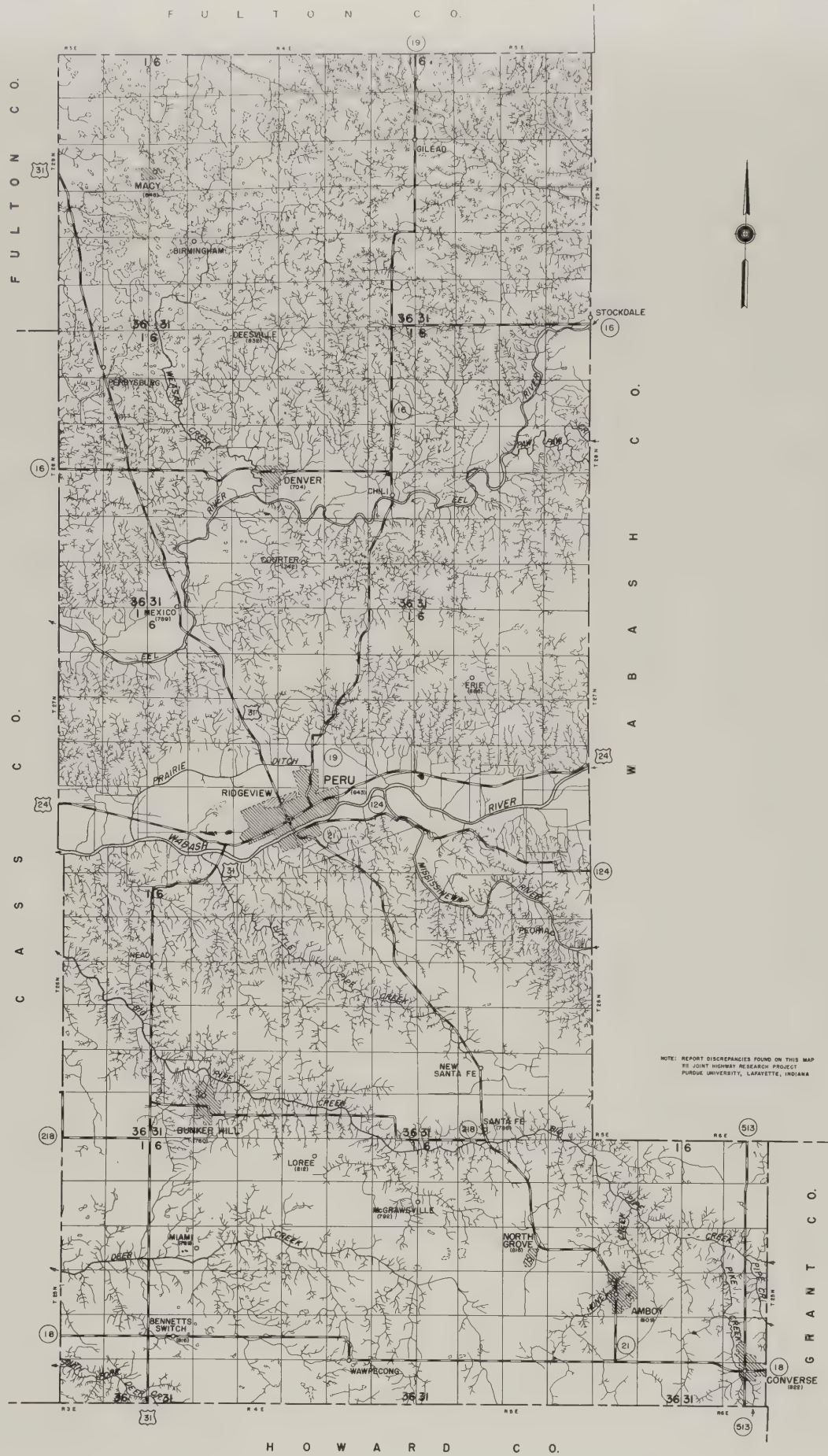
The Wabash Valley acted as a glacial sluiceway and is rather wide in places. Streams are widely spaced in the southern part. There is little development of natural drainageways in the southern part of the county. Natural drainage is best developed in the uplands adjacent the Wabash Valley. The area between the Wabash and Eel rivers has fair natural drainage. The northern part is well drained due to a more rolling terrain, although several nearly flat areas do exist. Little Pipe Creek contacts rock near Peru. Headwater streams of Big Pipe Creek have tortuous courses. Crests of sections of moraines define watershed divides in the county. Some stream courses and some stream deflections are affected, at least partially, by the presence of the moraines. Increased densities of drainage patterns in the northern part occur in a morainic area. The course of Eel River appears to be controlled by the Packerton moraine. The Eel River valley is fairly wide but its valley walls are not as abrupt as those of the Wabash valley; it is, however, rather deeply entrenched. Deer Creek crosses a morainic area. The general course of Big Pipe Creek nearly parallels the Union City moraine; its headwater streams are apparently influenced by the moraine because of their northerly direction of flow. Deer Creek flows in a westerly direction; its headwater streams flow northerly. In general, tributaries of the Wabash River from the north are small. Eel River flows along the south side of the Packerton moraine. Its tributaries show deflections. Actual flood plains of the Wabash and Mississinewa river valleys are narrow in places. Tippecanoe tributaries drain the northwest corner.

There are no natural lakes in the county. Ponds of various origins exist in the several sections of the area.

Ditches have been constructed in the nearly level and low-lying areas to improve sluggish drainage conditions. Streams have been dredged; e.g., Deer Creek in the southern part of the county. Ground water levels have been lowered in many places.

Stream gaging stations are located on the Wabash River at Peru and on the Mississinewa River at Peoria (12). The drainage area of the Wabash River above Peru is about 2,810 square miles (11). The Mississinewa River has a drainage area of about 890 square miles (11).

Note: The drainage map was prepared from 1941 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1953.



DRAINAGE MAP MIAMI COUNTY INDIANA

PREPARED FROM
1941 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1953



POLYCONIC PROJECTION

DRAWN BY R. ARETZ

MONROE COUNTY

GENERAL NATURE OF THE COUNTY

Monroe County is located in the south-central part of the state. Its area is approximately 412 square miles (1). Bloomington, the county seat, is 45 miles southwest of Indianapolis.

Mean annual precipitation is 44.18 inches at Bloomington (2). An average annual snowfall of at least 25 inches can be expected.

Monroe County lies within three physiographic regions of the state. They are progressively from east to west as follows: The Norman Upland, the Mitchell Plain, and the Crawford Upland (3). In respect to its physiographic situation in the United States, the northern part of the county (glaciated portion) is in the Till Plains section of the Central Lowland province and the remainder is in the Highland Rim Plateau section of the Interior Low Plateaus province (3).

The surface of the county varies from nearly level to very rolling. The eastern part of the county is severely dissected by Salt and Bean Blossom creeks and their tributaries. The White River valley, along the northwest corner is deep. Maximum local relief is about 400 feet (3). West of Bloomington there are a number of closed basins in the limestone area; drainage is through underground passages. Bedrock terraces occur along Bean Blossom and Salt creeks. West of Clear Creek is an abrupt ridge. Sinkholes in the limestone plains have produced a pitted terrain. Ponds are formed in some of the plugged sinkholes. Rock islands break the monotony of the nearly level lakebeds. Breaks in the slopes of some of the hills in the western part occur at changes in the bedrock formations. Glaciated surfaces reflect underlying bedrock topography. Sharp-crested divides separate watersheds in the Norman Upland region; valleys are V-shaped; valley floors are usually narrow. Lakebed remnants in the Bean Blossom valley are dissected. Delta-like formations occur in the valley. In the western part, the surface is highly dissected, especially west of the Clear Creek valley. Isolated sandstone capped hills are found here. Isolated hills are present in the White River valley. Some fairly smooth terrain is found west of Bloomington. Very irregular Karst topography has been produced in parts of the limestone areas. The most nearly level terrain is that of the terraces and lakebeds. Sinkholes are sometimes found in sandstone areas because of underlying limestones.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock, in most of the county, consists of strata of Mississippian age. There are a few small areas in the western part of the county where the uppermost strata are of Pennsylvanian age. The formations consist of limestones, shales, and sandstones. Rock outcrops in nearly all parts of the county. North-south faults cross the eastern part. Massive ledges of sandstone occur in the western part.

The extreme northern part of the county was glaciated. The drift is Illinoian in age (3). The drift border is rather indistinct. The drift is thin near the border; much of it has been removed by erosion.

The soils of the county have been derived from glacial and residual materials (5)(47). Some of the materials have been reworked by wind and water. Silty top soils occur in the depressions west of Bloomington. Residual sandstone-shale soils belong to the Muskingum-Zanesville catena. Glacial drift soils are of the Cincinnati catena. Residual limestone soils belong to the Hagerstown and Frederick catenas. Angular chert fragments are found in some of these soils. Lakebed soils are of the Robinson catena. Sand areas have Princeton soils. Alluvial soils are sands, silts, and clays belonging to the Eel-Genesee, Pope-Philo, and Huntington catenas. Upland subsoils in the central part are moderately to slowly permeable depending upon the topography (6). A small area in the northwest corner has slowly to very slowly permeable subsoils. River valley subsoils are mostly permeable.

Some glacial gravel is found along White River and Bean Blossom Creek and at other places in the northern part (7)(10). In the southern part, the gravels are mostly stream deposits of bedrock fragments. Cherty gravels have been found in the uplands along Salt Creek in the extreme southern part of the county. Cherty gravels are also found in the stream valleys of the northern part. Some gravel is exposed by erosion. Delta-like features in the Bean Blossom Creek valley are granular. Sands are found in the upland areas north of Stinesville. Some sand is found in the Bean Blossom valley. The "Flatwoods" is a glacial lakebed, a portion of which lies in the north-western part of the county. A few lacustrine terraces occur in the Bean Blossom Creek valley.

DRAINAGE FEATURES

Monroe County lies wholly within the White River drainage basin of the state, the southeastern half being in the East Fork White River subdivision of the basin (3).

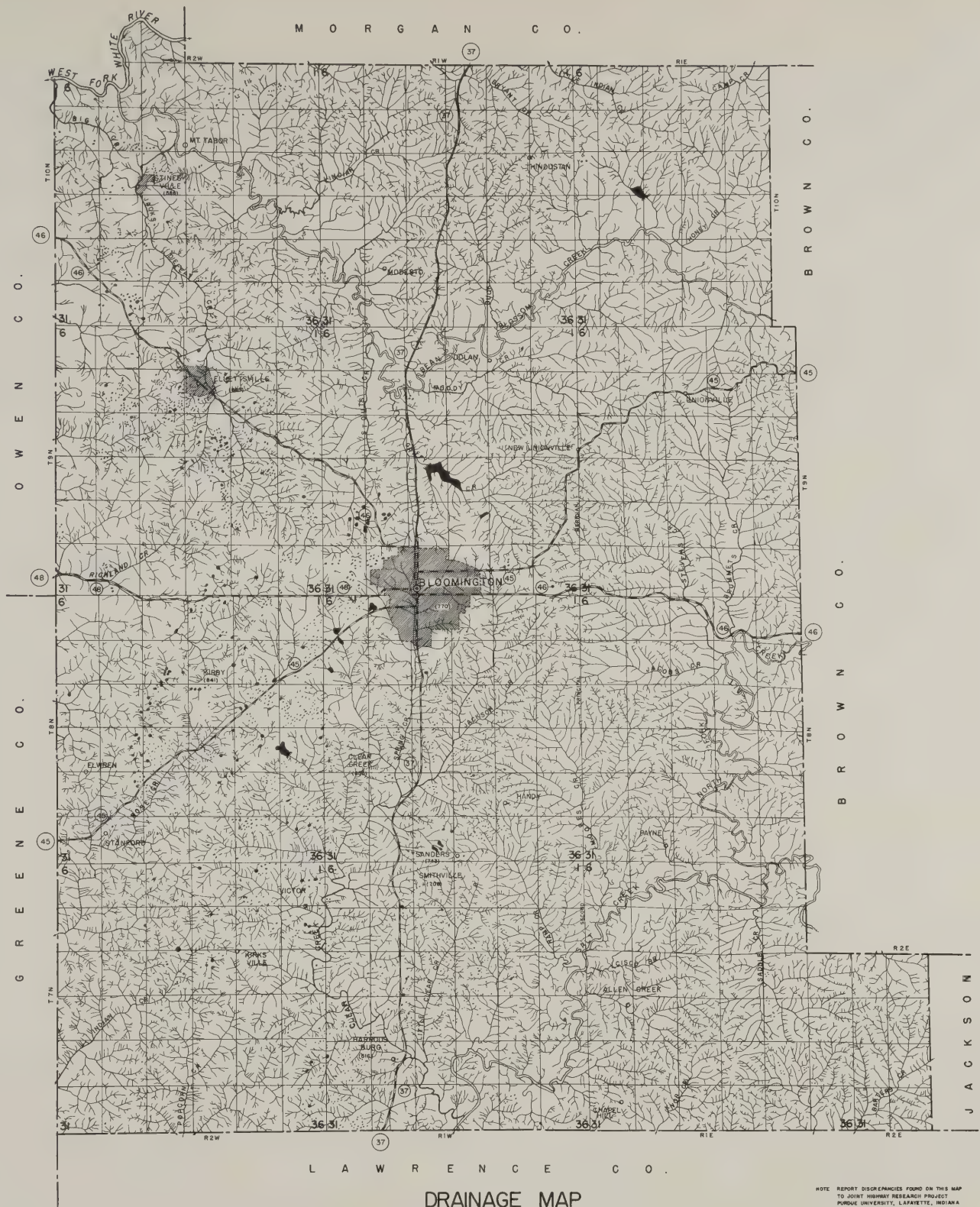
Both Salt and Bean Blossom creeks meander in rather deep valleys. Valley widths vary; in places they are quite wide. The Bean Blossom and Salt Creek valleys acted as glacial sluiceways. The White River valley was also a glacial sluiceway. Salt Creek valley appears to be aggraded. Bean Blossom Creek valley in its lower reaches is narrow. Surface drainageways are well developed in the eastern part of the county. In the limestone regions much of the drainage is underground. Surface expressions are sinkholes and small stream systems ending in sinkholes. Clear Creek receives water from subterranean tributaries. Large springs exist in some of the valleys southwest of Bloomington. Underground drainage may or may not contribute to the immediate runoff of the adjacent stream. Many streams flow on rock in portions of their courses. The courses of the natural drainageways have been interrupted by quarrying operations in the central part of the county. Prominent is the north-south direction of portions of Salt Creek. Other streams displaying similar reaches of channel are Bean Blossom and Clear creeks. These streams, thusly, show evidence of rock control. Drainage patterns are relatively fine-textured in all upland areas. They appear noticeably different in the eastern, central, and western parts. Tributaries of Salt Creek, Brummets Creek from the north, and Saddle Creek from the south, appear to be rock-controlled. Streams passing through the Crawford Upland have meandering courses; they are entrenched in rock. The valleys of the upper reaches of Clear and Indian creeks are rather shallow, with low and somewhat uniform gradients. Moores Creek has many branches; gradients are high and valley walls are steep. In much of the eastern part streams have high gradients.

There are no natural lakes in the county. Reservoirs, water-filled quarries, and ponds of various origins are scattered throughout the area. Artificial lakes are not shown on the map because the area was photographed prior to their construction.

Ditches have been constructed where necessary to improve sluggish drainage conditions.

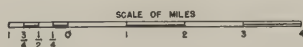
A stream gaging station is located on Bean Blossom Creek at Dolan (12).

Note: The drainage map was prepared from 1939 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1947.



DRAINAGE MAP
MONROE COUNTY
 INDIANA

PREPARED FROM
 1939 AAA AERIAL PHOTOGRAPHS
 BY
 STATE HIGHWAY COMMISSION OF INDIANA
 AT
 PURDUE UNIVERSITY
 1947



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 TO JOINT HIGHWAY RESEARCH PROJECT
 PURDUE UNIVERSITY, LAFAYETTE, INDIANA

MONTGOMERY COUNTY

GENERAL NATURE OF THE COUNTY

Montgomery County is located in the west-central part of the state. Its area is approximately 507 square miles (1). Crawfordsville, the county seat, is 45 miles northwest of Indianapolis.

Mean annual precipitation is 38.74 inches at Crawfordsville (2). An average annual snowfall from 20 to 25 inches can be expected.

Montgomery County lies wholly within the Tipton Till Plain physiographic region of the state (3). In respect to its physiographic situation in the United States it is in the Till Plains section of the Central Lowland province (3).

The surface of the county is that of a glacial plain. It is broken by the valleys of Sugar, Coal, and Raccoon Creeks and their tributaries. It is ridged by moraines. Maximum local relief is about 180 feet (3). Morainic features consist of clustered, conical hills north of Elmdale; scattered knolls south of Darlington; undulating ridges south of Crawfordsville; and rolling ridges north of Alamo. Knolls occur south of Sugar Creek in the southwestern part. Lakebed areas are relatively level. There is a low and nearly level tract east of Cherry Grove. Intermorainic areas are gently rolling. Plain features exist south and east of Ladoga. In the northwestern part low knolls and ridges are interspersed with basins and nearly flat tracts. Knolls occur on the borders of Raccoon Creek.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock consists, in most of the county, of strata of Mississippian age. There is a small area in the southwest corner of the county where the uppermost rock strata are of Pennsylvanian age. Bedrock outcrops in many places. Limestone is exposed in Sugar Creek at Crawfordsville. Sandstones outcrop in the southwest corner of the county. Shale is exposed along portions of Black and Sugar creeks. Limestone is exposed along Lye Creek.

All Montgomery County was glaciated (3). Surface glacial drift is Wisconsin in age. The thickness of the drift varies to more than 150 feet according to the preglacial topography. Ridges of two morainic systems traverse the county. The Champaign moraine covers much of the western side but narrows nearly to a point at the center of the county and then extends to the southeast corner. A portion of the Bloomington moraine crosses from the northwest corner to the center of the east county line. In many places the knolls are clustered. Morainic features are prominent near Waynetown.

The soils of the county have developed from glacial materials, some of which have been reworked by water (5). Upland soils belong to the Miami, Russell, and Carrington catenas. Fox soils are found on the granular deposits. Alluvial soils belong to the Genesee catena. Clyde and Cope soils occur in the depressions. Organic soils are mucks. Sub-

soils are moderately permeable in sloping uplands to slowly permeable in depressions and nearly level areas (6). River valley subsoils are mostly permeable.

Deposits of granular materials are well-distributed over the county (7). Gravel has been found along Raccoon Creek, and Sugar Creek. Ridges, like the Hazelrigg esker, contain granular materials; knolls are found elsewhere (10). Other ridges occur along Sugar Creek. Areas producing sands and gravels are located in the central, central-northern, and southwestern parts. There is a plain containing granular material lying northeast of Crawfordsville.

Lakebeds have been mapped along the Lye Creek drainage system and in the south-central part of the county. Some peat and muck deposits are scattered over the county. Sand streaks occur in the stream valleys.

DRAINAGE FEATURES

Montgomery County is contained within the Wabash drainage basin of the state (3). Much of it is in the Sugar Creek subdivision. The northwest corner is drained by the Coal Creek system and the southeast corner of the Raccoon Creek system.

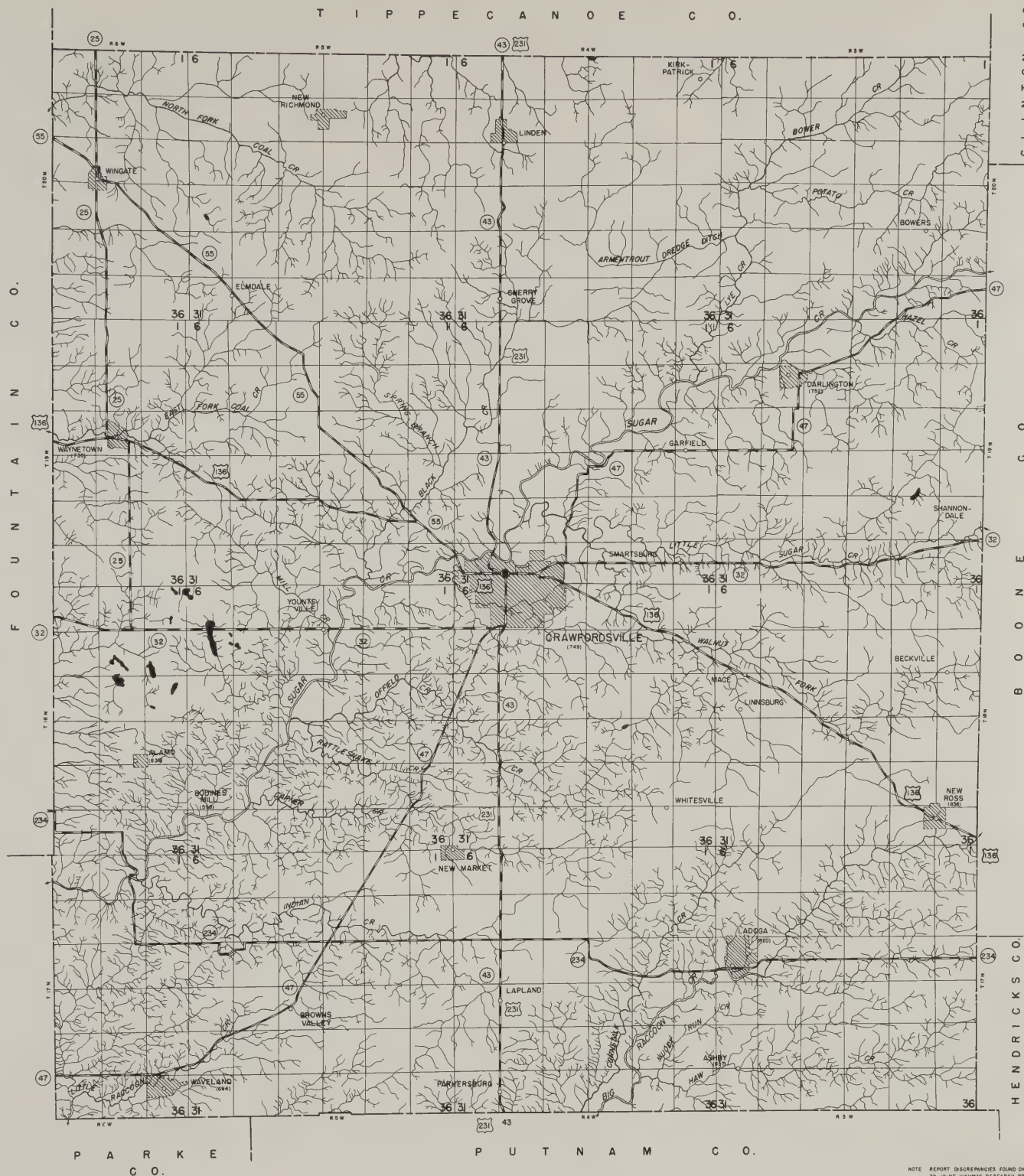
Drainage has a southwestern trend except in the northwestern corner where it is westerly. Sugar Creek flows through morainic areas in the county. This stream is entrenched in the southwestern part of the county. It crosses a preglacial channel near Crawfordsville. It has a rather shallow valley in the eastern part. Natural drainage is perhaps best developed along this stream valley and along the valleys of the other principal streams. Crests of sections of moraines in the county define local watershed divides. Some stream courses and some stream deflections are controlled, to a certain extent, by the presence of the moraines. Drainage patterns conform to topography and surface materials of the morainic areas. Streams in the northwestern part have a westerly trend. Headwater streams of Coal Creek flow in wide, shallow valleys. Some streams flow on rock in portions of their courses. A few minor waterfalls exist in tributaries of Sugar Creek.

There are no natural lakes in the county. Ponds of various origins are scattered throughout the area.

Ditches have been constructed to improve sluggish drainage conditions in low-lying areas, noticeably in the lakebed areas.

A stream gaging station is located on Sugar Creek at Crawfordsville, above which the creek drains about 537 square miles (12).

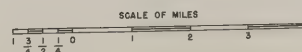
Note: The drainage map was prepared from 1939 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1946.



DRAINAGE MAP MONTGOMERY COUNTY INDIANA

PREPARED FROM
1939 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY

1946



MORGAN COUNTY

GENERAL NATURE OF THE COUNTY

Morgan County is located in the south-central part of the state. Its area is approximately 406 square miles (1). Its county seat, Martinsville, is 30 miles southwest of Indianapolis.

Mean annual rainfall is 40.72 inches at Martinsville (2). An average annual snowfall of about 20 inches can be expected.

Small areas in the west-central and southwestern parts of Morgan County lie in the Mitchell Plain physiographic region of the state (3). The northern and eastern portions are in the Till Plain region, and the remainder of the county is included in the Norman Upland. In respect to its physiographic situation in the United States, the county is in the Till Plains section of the Central Lowland province (3).

The surface of the county is that of a glaciated plain greatly dissected by White River and its tributaries. Influence of underlying rock and moraines adds to its uneven character. Maximum local relief is about 275 feet (3). The topography is of great variety and complexity. The northern third is less dissected than the remainder. Some well defined ridges exist, especially in the southern part. Some ridge tops are nearly level. The White River valley is wide. The central and southern uplands are dissected. In the Mitchell Plain portion a well developed Karst topography exists; the terrain is pitted by sinkholes. Lakebed areas are relatively flat. In the northwestern part little stream dissection has occurred. Basins are found in the moraine east of Martinsville. A high, narrow ridge lies southeast of Martinsville.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock in the extreme northeast corner of the county is of Devonian age. In the remainder of the county the uppermost rock strata are of Mississippian age. Shales outcrop in a few places in the northeastern part of the county. Limestone and sandstone outcrop in various places. Shales are found at Martinsville.

All Morgan County was glaciated (3). The drift in the southwestern half is of Illinoian age. The remainder of the county is covered with Wisconsin drift. The deposits are nearly 100 feet thick in places; they vary according to the preglacial topography. The border between the two drifts is indistinct in some places. The old drift is thin in the southern part; a considerable amount has been removed by erosion. The Shelbyville moraine traverses the northwestern, central, and eastern parts of the county; and the knolls of the Champaign moraine are found in the northeastern corner (3). The Shelbyville moraine is attenuated in places.

The soils of the county have been derived from glacial materials some of which have been reworked by wind and water (5)(48). Wisconsin drift soils belong to the Miami and Russell catenas. Illinoian drift soils belong to the Cincinnati and Grayford catenas. Soils developed on sandstone are of the Zanesville catena. Fox soils are found on the granular deposits. Alluvial soils belong to the Genesee and Pope catenas. Subsoils in the uplands vary from moderately to very slowly permeable (6). River valley subsoils are mostly very permeable.

Granular materials occur along White River and its tributaries (7). They, also, have been obtained from knolls and ridges in other parts of the county. Some small outwash areas occur mostly along White River in the

central and northeastern parts of the county. Some granular knolls are present in the western part. Gravel has been found along White Lick Creek and Clear Creek. Granular deposits are scattered from Indian Creek to White River. Sand deposits occur on the lower slopes and on the uplands adjacent White River (48). One such area is located southeast of Martinsville. Lacustrine deposits occur in the northwestern part in the form of glacial lakebeds (23).

DRAINAGE FEATURES

Morgan County lies within the White River drainage basin of the state (3). The western part is in the Eel subdivision of the basin and the remainder of the county is in the main White River basin.

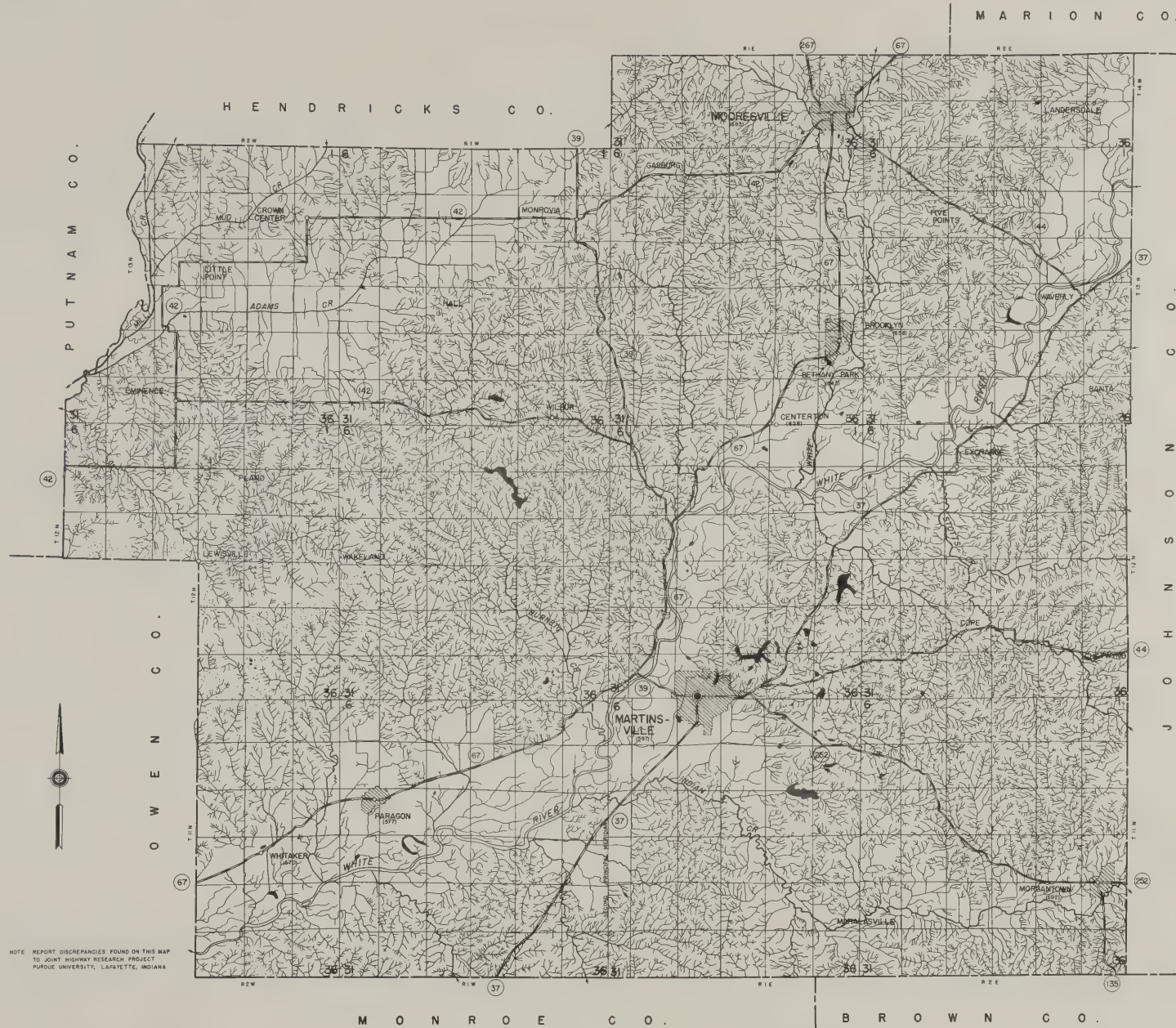
Drainage is generally in a southwesterly direction. Near Morgantown, Indian Creek flows in a trough north of one of the prominent east-west ridges which so conspicuously traverse southern Morgan and north and central Brown counties. There is some subterranean drainage in the western part in the limestone areas; runoff into the streams in the immediate vicinity may or may not be affected by this type of drainage. White River valley acted as a glacial sluiceway; this is evidenced by the granular deposits in the valley. The valley is rather broad and is fairly deep. The river follows a preglacial channel in the southwestern part of the county. Upland drainage systems are generally well developed, especially near the principal streams; most drainage patterns are fine-textured. Some of the stream valleys are ravine-like. Many streams flow on rock in portions of their courses. Main streams in the northwestern part have low gradients. A watershed divide crosses the northwest quarter of the county in a northeast-southwest direction. Crests of sections of moraines define watershed divides in the county. Stream courses, and stream deflections have been affected by the presence of the moraines; drainage patterns are fine-textured. White River crosses a morainic area. McCracken Creek exhibits a curving course in the central-northern part. Tributaries of White River from the north show a marked southerly trend. Very few short streams enter White River from the west in the northeast corner of the county. Stotts and Crooked creeks are deflected.

There are no natural lakes in the county. Artificial lakes and ponds of various origins are scattered throughout the area. Bayous are found in the White River valley.

Ditches have been constructed in the nearly level portions of the county to improve sluggish drainage conditions, many of which are in the glacial lakebed areas. Mill Creek has been dredged. Other examples are found in the White River and Indian Creek valleys.

A stream gaging station is located on White River near Centerton (12). The drainage area of the White River above Martinsville is about 2,500 square miles (11).

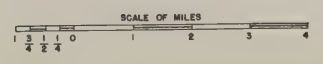
Note: The drainage map was prepared from 1939 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1949.



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TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP MORGAN COUNTY INDIANA

PREPARED FROM
1939 AAA AERIAL PHOTOGRAPHS
BY
STATE HIGHWAY COMMISSION OF INDIANA
AT
PURDUE UNIVERSITY
1949



POLYCONIC PROJECTION

NEWTON COUNTY

GENERAL NATURE OF THE COUNTY

Newton County is located in the northwestern part of the state. Its area is approximately 413 square miles (1). Kentland, the county seat, is about 100 miles northwest of Indianapolis.

Mean annual precipitation is 35.90 inches at Kentland (2). An average annual snowfall of at least 25 inches can be expected.

The southern tenth of Newton County lies within the Tipton Till Plain physiographic region of the state, and the remainder of the county is in the Kankakee Lacustrine section of the Northern Moraine and Lake region (3). In respect to its physiographic situation in the United States the southern part is in the Till Plains section, and the northern part is in the Eastern Lake section of the Central Lowland province (3).

The surface of the county is that of a glaciated plain broken by the Kankakee and Iroquois rivers and their tributaries. It has been modified by wind and water action. It is ridged by a moraine. Maximum local relief is about 60 feet (3). The moraine is undulating to rolling. The rise from the plain on the south to the crest of the moraine is rather abrupt. The till plain area is undulating to gently rolling. Small stream valley walls are rather steep. The moraine is composed of many knolls and ridges interspersed with shallow basins. Sand dunes are abundant, especially in the northern part of the county. There is a distinct beach line which extends in an east-west direction, immediately north of Kentland. The land for several miles adjacent the Kankakee River is a nearly level, sandy lacustrine plain. The Iroquois basin is undulating to nearly level.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock in the northern part of Newton County consists of strata of Silurian age. With a few exceptions, the bedrock in the southern part of the county is of Devonian age. A small area, lying east of Kentland, contains strata that apparently are of Ordovician age. Other small areas, also in the southern part, have formations of Mississippian and Pennsylvanian age. Limestone is quarried east of Kentland. Limestone outcrops near Goodland.

All Newton County was glaciated. Surface drift is Wisconsin in age (3). The thickness of the drift varies to several hundred feet. The Marsailles moraine extends in an east-west direction across the central part of the county. There seems to be little range in elevation of this moraine.

Soils of the county have been developed from glacial materials, many of which have been reworked by water and wind (5)(49). Soils of the Parr catena are found in the uplands. Soils of the moraine and till plains belong to the Miami catena. Soils of the glacio-fluvial outwash and lake plains belong to the Jasper catena. Plainfield soils are sands. Griffin soils are alluvial. Organic soils are mucks and peat. The southern half of the county has subsoils which are moderately to slowly permeable depending upon the topography (6). In the sandy northern part, the subsoils are very permeable.

Some gravel has been found near Morocco, Brook, and Goodland (7). Stratified granular materials occur in parts of the Iroquois valley. Sand dunes and ridges occur along the northern boundary of the Marsailles moraine (49). Erosion on the sand dunes is reduced to a minimum. There are many sand dunes in the lacustrine sand plain bordering the Kankakee. Sand ridges have a general northeast-southwest directional trend except the smaller ones which form a random pattern. Occasional sand ridges occur in the Iroquois basin. A sand ridge extends eastward from near Kentland, passing close to Goodland (9). Thin beds of silt have been found in the Iroquois basin.

Large areas in the lakebed portion of the county have been mapped as muck. Depressed areas contain soils of high organic content.

DRAINAGE FEATURES

Newton County lies wholly within the Kankakee drainage basin of the state (3).

Beaver Creek, and the Kankakee and Iroquois rivers drain westward into Illinois. The direction of flow of Beaver Creek appears to be controlled, at least in part, by the Marsailles moraine. Kent Ditch crosses the moraine in the central-eastern part of the county; it joins the Iroquois River in Jasper County. Natural drainage is perhaps best developed along the Iroquois River valley. There is a tendency toward parallelism of the stream pattern in the southern part of the county due to the long, even slope of the area in the direction of the Iroquois River. The crest of the Marsailles moraine more or less defines a watershed divide in the county. Some stream courses and some stream deflections can be attributed, at least partially, to the presence of the moraine. Increased density of drainage patterns occurs in the morainic area. The Iroquois Valley is included as a part of the Kankakee lacustrine section.

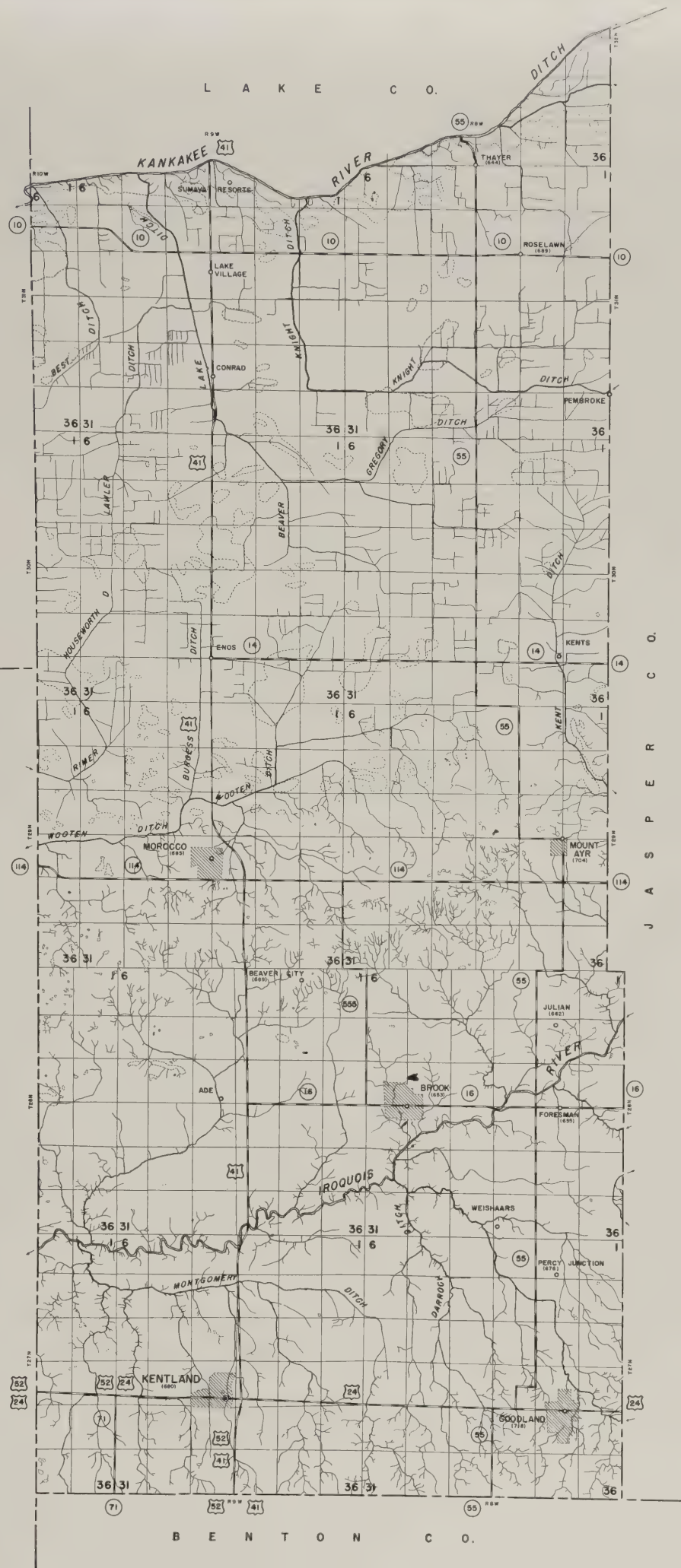
Former lakes (e.g., Beaver Lake) have been artificially drained and obliterated. Ponds of various origins exist in many parts of the area.

Ditches are employed extensively to improve sluggish drainage conditions. The Kankakee River and other streams have been dredged. The ground water level has been lowered along the Kankakee River.

A stream gaging station is located on the Iroquois River near Foresman (12). The Iroquois River has a drainage area of about 800 square miles, most of which is in Newton and Jasper counties.

Note: The drainage map was prepared from 1939 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1954.

STATE OF ILLINOIS
COUNTY OF KANKAKEE



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP NEWTON COUNTY INDIANA

PREPARED FROM
1939 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1954



NOBLE COUNTY

GENERAL NATURE OF THE COUNTY

Noble County is located in the northeastern part of the state. Its area is approximately 410 square miles (1). Albion, the county seat, is about 120 miles northeast of Indianapolis.

Mean annual precipitation is 33.10 inches at Kendallville, and 30.50 inches at Albion (2). An average annual snowfall of at least 30 inches can be expected.

Noble County lies wholly within the Steuben Morainal Lake section of the Northern Moraine and Lake physiographic region of the state (3). In respect to its physiographic situation in the United States, it is in the Eastern Lake section of the Central Lowland province (3).

The surface of the county is that of a glacial plain broken by the valleys of Elkhart and Tippecanoe rivers and their tributaries. It is ridged by moraines. Maximum local relief is about 90 feet (3). Morainic topography consists of steep-sided ridges and deep basins. It is of the swell and sag type (3). It is prominent in places. Near Ligonier and Albion morainic topography consists of confused groups of dome-shaped or conical hills with interspersed basins of corresponding shape. Some nearly level terrain exists in the northwestern corner. The ground moraine in the southern part is gently undulating (3). Till plain topography occurs in the western part. Outwash plains are scattered.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock in the southern part of Noble County consists of strata of Devonian age. In the northern part, they are of Mississippian age. There are no known outcrops of bedrock.

All Noble County was glaciated. Surface drift is Wisconsin in age (3). The drift thickness is as much as 485 feet; it varies according to the preglacial topography. Nearly all the eastern portion is covered with sections of the Mississinewa and Salamonie moraines which coalesce in the county (3). The Packerton moraine occupies a sizeable area in the southwestern part. Portions of the New Paris, Topeka, and LaGrange moraines extend into the county from the northwest in its western, northwestern and northern parts, respectively. Ridged drift extends northward from Rome City. Near Wolcottville is a similar ridge. The New Paris moraine contains lake basins.

The soils have been derived from glacial materials (5). Many of the materials have been reworked by wind and water. Upland soils belong to the Miami and St. Clair catenas. Fox and Warsaw soils occur on the granular deposits. Alluvial soils are of the Genesee catena. Organic soils are mucks and peat. Much of the county has permeable subsoils (6). In the southeast corner they are slowly to very slowly permeable. Sandy or gravelly areas have very permeable subsoils.

Granular materials have been found along the major streams and in knolls and ridges (7). Areas producing sands and gravels are located in the central-southern, northeastern, and northwestern parts of the county. Granular materials occur in the Elkhart River valley. There is a conspicuous plain of granular material south of the Elkhart River in the western part of the county. Near Albion and Rome City are plains of granular materials.

DRAINAGE FEATURES

Noble County lies in three major drainage basins of the state (3). The eastern part is in the Maumee, the southern part is in the Wabash, and the central and northern parts are in the St. Joseph drainage basin.

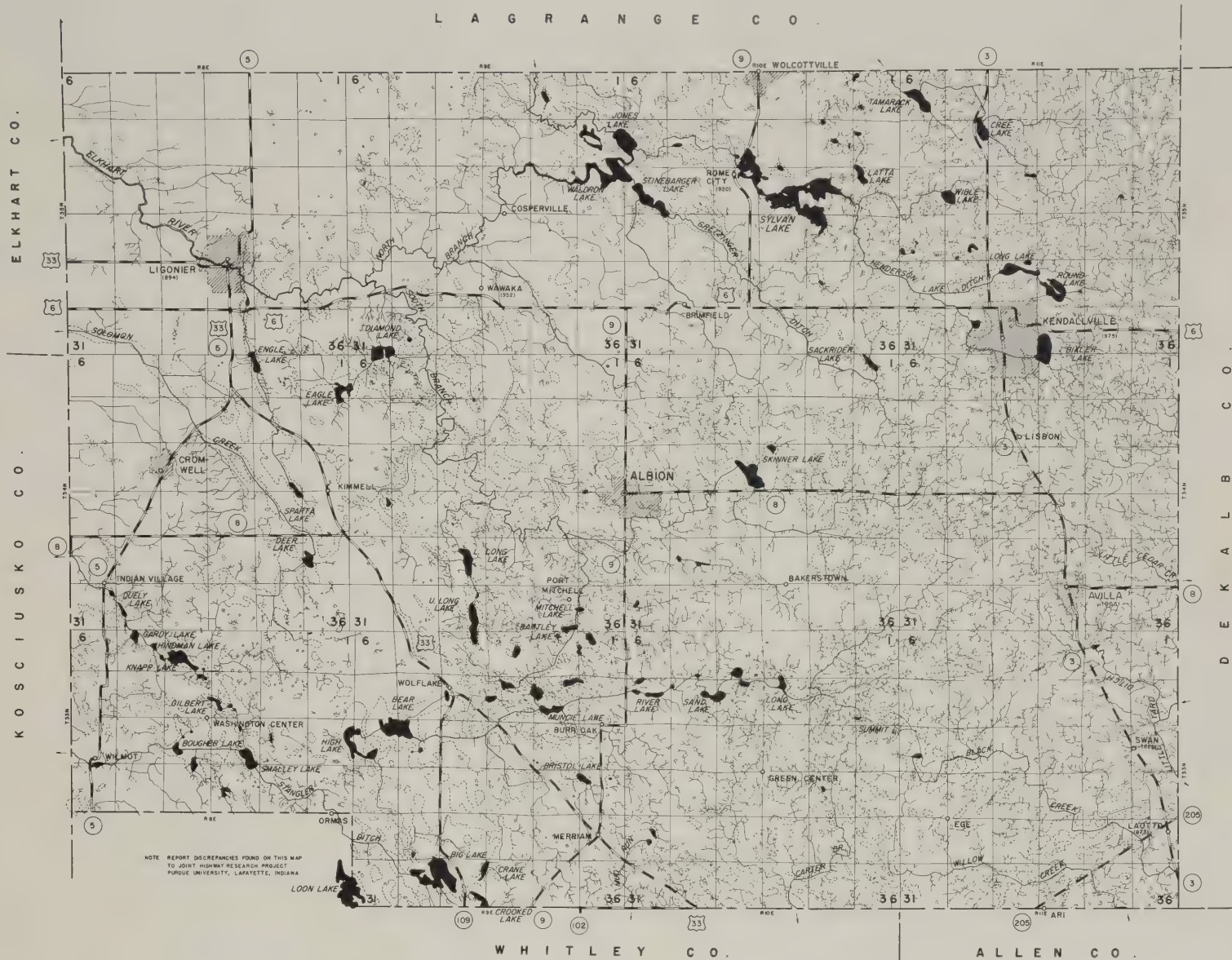
Natural drainage is perhaps best developed along the Elkhart River system. As a whole, natural drainage is weakly developed in most of the county, especially in the northwestern corner where granular materials exist. The crests of sections of moraines define watershed divides in the county. Some courses of streams, and some stream deflections appear to be controlled, at least partially, by the presence of the moraines. Drainage patterns conform, more or less, to surface topography and to the materials in the morainic areas. Major watershed divides occur in the southern and southeastern parts. The trend of the drainage is westerly except in the southeastern part. Headwater streams of several river systems rise in or cross morainic areas; this includes the headwater streams of the Elkhart River. Solomon Creek flows in a wide shallow valley.

There are several lakes (both natural and artificial) in the county. Also ponds of various origins are scattered throughout the area. Some lakes have swampy borders (7). The lakes are fairly well distributed although none exists in the northwest part. The Tippecanoe River has some of its sources in the lake region of this county. Morainal ridges rise abruptly from some of the lakes while other lakes have swampy margins. Lakes tend to stabilize the flow of their outlet streams. Many streams wander from lake to lake in their courses. The lakes have a great variety of size, depth, and outline of shore. The lakes furnish water to streams flowing in many directions.

Gaging stations are located on Baugher, Bear, Big, Bixler, Cree, Crooked, Eagle, Horseshoe, Knapp, Lower Long Lake, Rider, Sand, Skinner, Smalley, Sparta, and Sylvan Lakes (12).

Ditches have been constructed to improve sluggish drainage conditions. Streams have been dredged.

Note: The drainage map was prepared from 1938 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1953.



DRAINAGE MAP NOBLE COUNTY INDIANA

PREPARED FROM
1938 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1953



OHIO COUNTY

GENERAL NATURE OF THE COUNTY

Ohio County is located in the southeastern part of the state. Its area is approximately 87 square miles (1). Rising Sun, the county seat, is 90 miles southeast of Indianapolis.

From data obtained in surrounding counties, the mean annual precipitation should be about 42 inches (2). An average annual snowfall of about 25 inches can be expected.

Ohio County lies wholly within the Dearborn Upland physiographic region of the state (3). In respect to its physiographic situation in the United States, it is in the Till Plains section of the Central Lowland province (3).

On the whole, the county is hilly. It is a dissected glaciated plain from which much of the drift has been removed. Maximum local relief is about 400 feet (3). Ridges near the Ohio River valley are long and even topped; their tops appear at the same elevation. There are small areas of fairly level upland in the south-central part. Most streams are rather short with relatively high gradients. Along the main stream valleys the slopes are quite steep. Stream valleys are rather narrow with the exception of Laughery Creek valley. Occasionally sinkholes are to be found in local areas, mostly adjacent the valley walls.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock consists of strata of Ordovician age which are composed of shales and limestones. These rocks outcrop in the hillsides and stream beds in nearly all parts of the county.

The county is within the regional limits of Illinoian glaciation and the tops of the ridges are still covered with glacial drift (3)(28). Erosion has removed much of the drift from the slopes. The drift is probably the thickest in the south-central part. It is thin on the ridge tops near the major streams.

The soils have been developed from glacial and residual materials, some of which are reworked by water (5)(50). Glacial drift soils are the Cincinnati catena. Limestone-shale soils belong to the Switzerland catena. Soils of the Wheeling catena are found on the Ohio Valley terraces. Alluvial soils are of the Huntington catena. Somewhat stony soils are found on the steep hillsides. Nearly level upland areas and most sloping areas have slowly permeable subsoils (6). River valley subsoils are mostly permeable.

Silt terraces are found in the Laughery Creek valley.

Rising Sun is built on a granular terrace which is several miles long (7). Areas producing sands and gravels are located in the central-eastern part. Deposits of fragments of local rocks are found along many of the small streams of the county. There are no extensive deposits of sand. Alluvium contains sand streaks.

DRAINAGE FEATURES

Ohio County lies wholly within the Minor Ohio drainage basin of the state (3).

Drainage systems are relatively well-developed in most of the county. Laughery Creek has turned east-northeast in its course to the Ohio River. The Ohio River is the base toward which the streams are eroding. It is deeply entrenched, as is Laughery Creek. Local subterranean drainage is confined to upland slopes adjacent the drainageways. Some streams are deflected by the terraces in the Laughery Creek valley. Many streams flow on rock in parts of their courses. Streams flowing over rock exhibit minor deflections in alignment due to the various resistant and nonresistant strata. Drainage patterns are fine-textured in most of the upland areas. Noticeable is the reversal in the course of Arnold Creek. South Fork Laughery Creek is a northerly flowing stream. It has a high gradient. A few small streams enter the Ohio River directly, mostly in the southern part. Terraces separate the river from the valley wall along nearly all the eastern side.

There are no natural lakes in the county. Ponds of various origins are scattered over the area.

Ditches have been constructed in the nearly level areas. In some upland areas drainage is accomplished by shallow surface ditches.

Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1946.



DRAINAGE MAP OHIO COUNTY INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1946



ORANGE COUNTY

GENERAL NATURE OF THE COUNTY

Orange County is located in the southern part of the state. Its area is approximately 405 square miles (1). Paoli, the county seat, is 85 miles south-southwest of Indianapolis.

From data collected in surrounding counties, mean annual precipitation should be about 45 inches. Likewise, an average annual snowfall of about 20 inches is expected.

The northeastern part of Orange County lies within the Mitchell Plain physiographic region of the state. The remainder (about three-fourths of the county) is in the Crawford Upland (3). In respect to its physiographic situation in the United States, the county is in the Highland Rim Plateaus section of the Interior Low Plateaus province (3).

The surface of the county varies from nearly level to extremely rolling sections. The north-central part is undulating. The southern and western parts are highly dissected. Maximum local relief is about 430 feet (3). Such differences in elevation create rugged topography. Shale benches present a step-type topography in some areas. The southern, central, and western parts have high ridges and narrow valleys. Sinkholes are abundant in the limestone plains. They give a pitted appearance to the terrain. This belt of Karst topography extends across the northeast corner of the county. Sinkholes vary in size -- some are quite large and rather deep. Sinkholes are sometimes found in sandstone areas because of underlying limestones.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). The Quaternary materials are both Pleistocene and recent in age. Bedrock in the western part of the county consists of strata of Pennsylvanian age. In the eastern and central parts they are of Mississippian age. Bedrock outcrops in nearly every section of the county; limestones, sandstones and shales outcrop in various places.

Orange County is in the driftless region of the state (3). There appear to be no effects of glaciation except perhaps some silty top soils. Alluvium is derived mostly from residual materials.

The soils have developed from residual and alluvial materials (5). Sandstone-shale soils are of the Zanesville catena. Limestone soils belong to the Hagerstown and Frederick catenas. Alluvial soils are of the Pope catena. A few depressions have soils of high organic content. Somewhat stony soils are found on the steep hillsides. In the northeastern part of the county the subsoils are moderately to slowly permeable (6). In the remainder of the county they are slowly permeable.

There are some stream gravels in the northeastern part of the county (7). Such deposits consist of local rock fragments. Apparently no sands exist in the county except perhaps those in local deposits of weathered sandstone.

DRAINAGE FEATURES

Orange County lies within three major drainage basins of the state (3). The northern half is in the East Fork subdivision of the White River basin, the southeast corner is in the Minor Ohio basin, and the remainder is in the Patoka drainage basin.

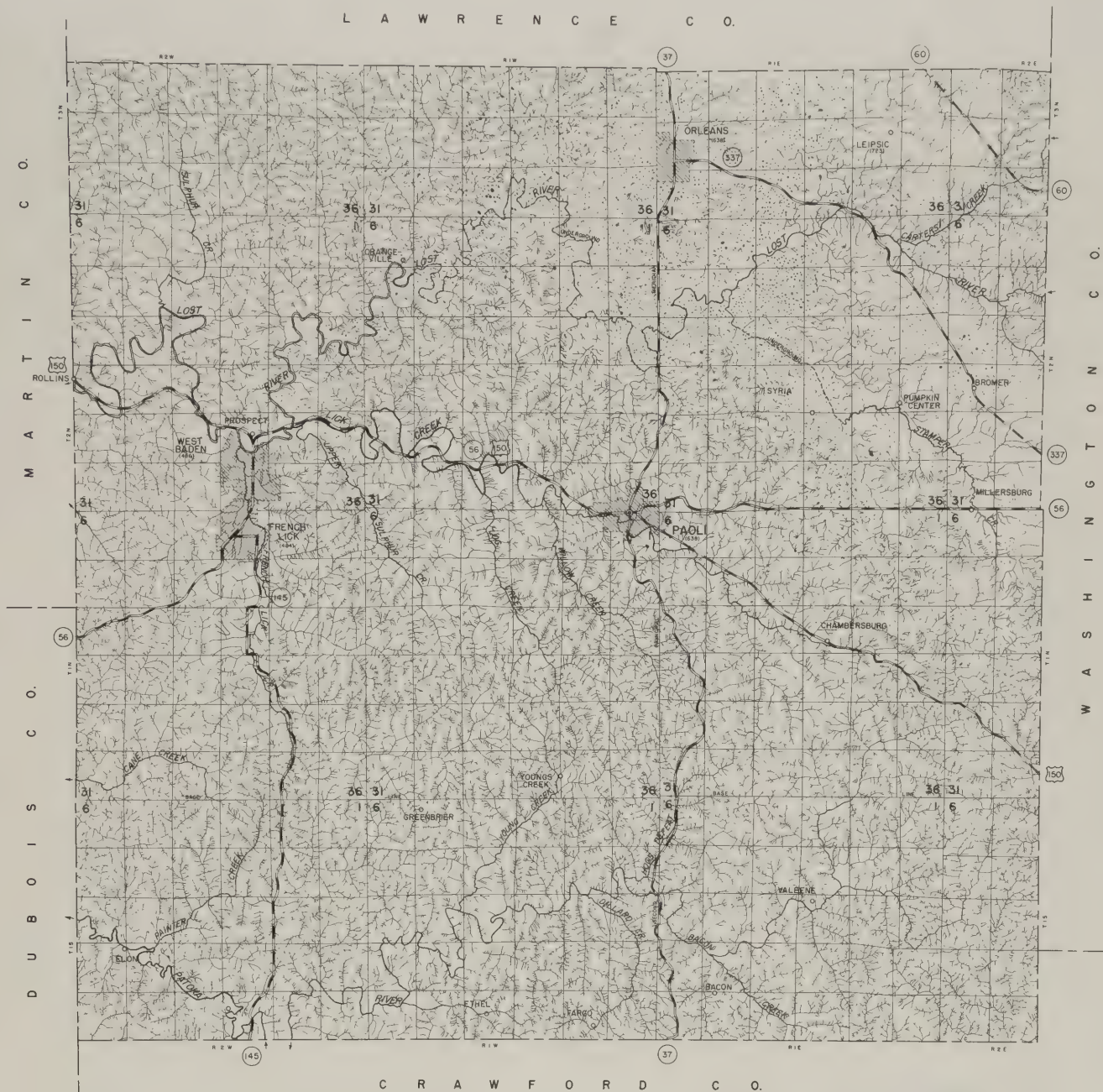
The trend of drainage is westerly. Surface drainage is best developed along the principal stream valleys. Lost River has a very meandering course, especially in the western part of the county. Its valley is narrow. In the Karst areas many streams disappear in sinkholes. Lost River flows in a subterranean channel except during periods of excessive rainfall (24). The surface channel is shown on the map. This is an outstanding example of subterranean drainage occurring in the limestone regions of the state. Subterranean drainage may or may not contribute to the runoff of the streams crossing the immediate area. Drainage patterns in the uplands in the remainder of the county are relatively fine-textured. Patoka River has a narrow valley in the county. French Lick Creek is a northerly flowing stream. Lick Creek shows the effects of rock control by its meanders. Stampers Creek is also a subterranean stream in a portion of its course; it is tributary to Lost River. Occasionally springs occur within the Karst areas as at West Baden and French Lick. The Pakota River is aggraded in the southwest corner of the county. In the western part of the county Lost River occupies a rather deep channel (3). The stream is meandering and rather sluggish in this location. It has a narrow flood plain.

There are no natural lakes in the county. Ponds of various origins are scattered over the area.

Ditches have been constructed wherever necessary to improve drainage conditions.

A stream gaging station is located on French Lick Creek at French Lick (12).

Note: The drainage map was prepared from 1938 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1953.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP ORANGE COUNTY INDIANA

PREPARED FROM
1938 AAA AERIAL PHOTOGRAPHS

BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1953



OWEN COUNTY

GENERAL NATURE OF THE COUNTY

Owen County is located in the west-central part of the state. Its area is approximately 391 square miles (1). Spencer, the county seat, is about 50 miles southwest of Indianapolis.

Mean annual precipitation is 40.60 inches at Spencer (2). An average annual snowfall of about 20 inches can be expected.

Owen County lies within four physiographic regions of the state. Progressively from east to west they are: The Norman Upland, the Mitchell Plain, the Crawford Upland, and the Wabash Lowland (3). In respect to its physiographic situation in the United States, most of the county is in the Till Plains section of the Central Lowlands province. Only the southeast corner is included in the Highland Rim Plateaus section of the Interior Low Plateaus province (3).

The surface of the county varies from nearly flat in the lakebed areas of the northeastern and southeastern parts of the county to the rolling upland in the central and southwestern portions. It is in part an eroded glacial plain and in part a dissected residual plain. Maximum local relief is about 300 feet (3). Underlying bedrock topography has influenced the unevenness of the glaciated portion. The valley floor of Eel River is nearly flat. Limestone bedrock areas are identified by Karst topography. In the eastern part sinkholes give a pitted appearance to the terrain. The alluviated valleys of Fish and Lick creeks are gently sloping.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock in the eastern part of the county consists of strata of Mississippian age. In the western part they are of Pennsylvanian age. Rock outcrops in nearly all parts of the county. Limestone forms the beds of some streams. Sandstones outcrop in the western part. Limestone is quarried in a number of places.

All the county except the southeast corner was glaciated. The drift is Illinoian in age. The drift border is rather indistinct due to the thin drift. The drift is thickest in the lowlands. Heavy deposits of gravelly drift are found northeast of Spencer. In the southeastern part, the drift is thin on the hills. A considerable part of it has been removed by erosion.

The soils have been derived from glacial, residual, and alluvial materials (5). Illinoian drift soils are of the Cincinnati catena. Muskingum soils occur in sandstone areas. Soils of the Grayford catena occur where the drift is thin on limestone. Residual limestone soils belong to the Hagerstown catena. Fox soils occur on the granular deposits. Lakebed areas have Dubois and Robinson soils. Alluvial soils belong to the Genesee and Pope catenas. Organic soils occur along Jordan Creek. Upland subsoils are slowly to very slowly permeable (6). River valley subsoils are mostly permeable.

Granular materials occur along the White River (7). Cherty gravels are found in the upland northeast of Spencer. Areas producing sands and gravels are located near the central part of the county. A preglacial valley lies northeast of Spencer.

Some sand exists in the White River valley. Local deposits of weathered sandstone and some glacial outwash occur. Glacial "Lake Quincy," and the "Flatwoods" are lacustrine areas (23). The Eel River valley is aggraded. Other streams entering White River have wide alluvial valleys. In the vicinity of Whitehall there are terraces and deposits of silt and sand.

DRAINAGE FEATURES

Owen County lies within the White River drainage basin of the state, the northwestern half being in the Eel subdivision of the basin (3).

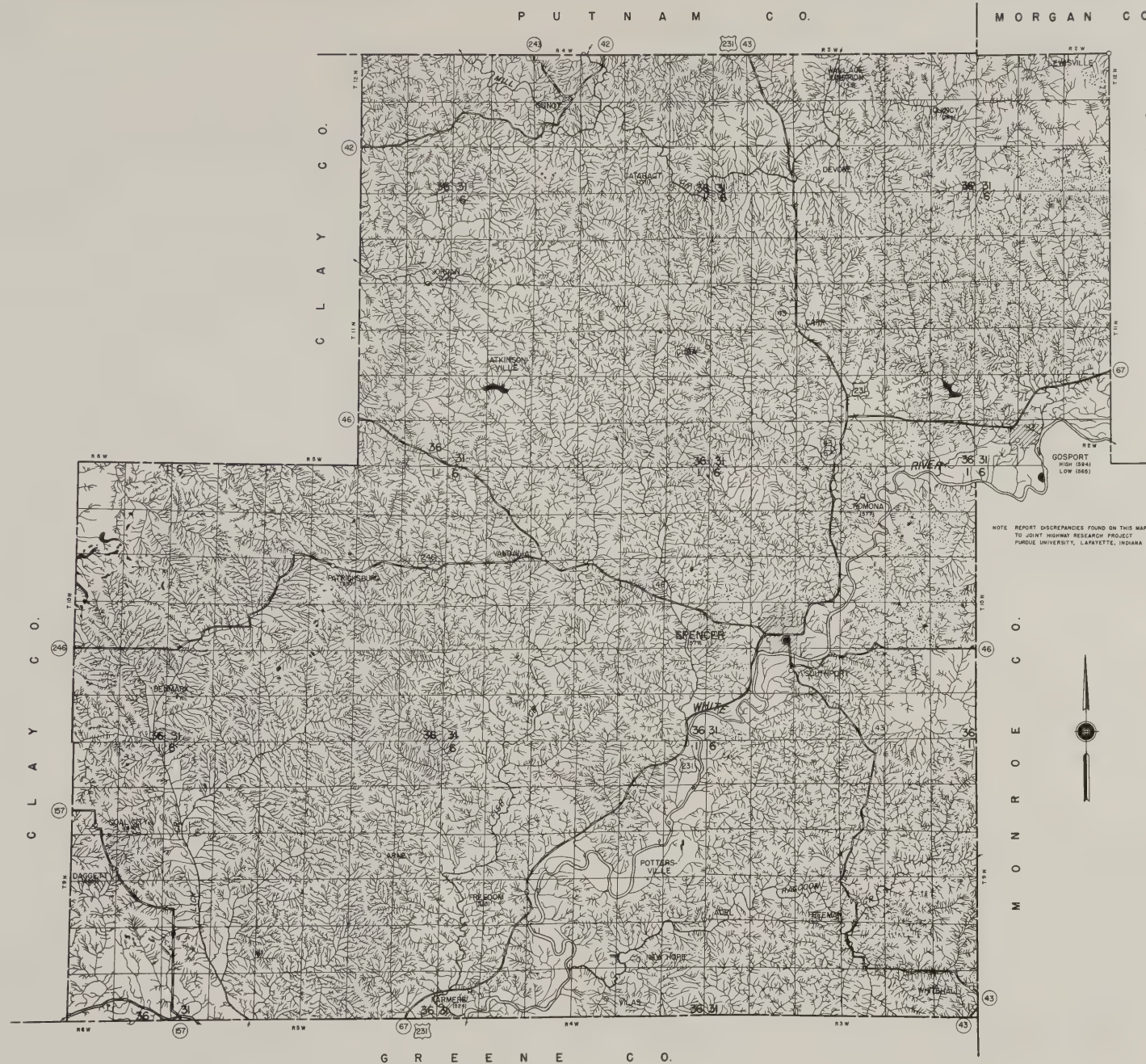
Surface drainage is best developed in the uplands in the central part of the county. In the southern part the trend of drainage is southwesterly, and in the northern part it is westerly. McCormicks Creek flows through a limestone gorge in its lower reaches. Streams in the southeastern part are entrenched in deep, narrow valleys. Subterranean drainage is much in evidence in the eastern and southeastern parts of the county. Caves are common. Subterranean drainage may or may not contribute to the runoff of the streams crossing the immediate area. In the western part the streams are rather sluggish. In the central-western part of the county, strip mines have disrupted the drainage systems. The White River valley varies in width. Some streams have ravine-like valleys where they are entrenched. Drainage patterns are fine-textured over most of the upland areas but they seem to vary with the type of underlying rock and surface materials. Eel River has a low gradient. White River and Eel River acted as glacial sluiceways. Noticeable is the curving course of Mill Creek; this has been attributed to the effects of glaciation. Streams entering White River through the right bank flow in a southerly direction. Nearly all major streams have meandering courses. White River crosses rock ridges between Ramona and Spencer. Raccoon Creek is deflected northward in its course near Freeman; this probably is due to glaciation. White River, in crossing the county, has formed a post glacial channel in some places -- in others it flows in a pre-glacial channel. Cataract Falls, in Mill Creek, are formed by ledges of limestone; they and their rapids have a combined height of nearly 100 feet (3). McCormicks Creek has a waterfall in its channel a short distance from its junction with White River.

There are no natural lakes in the county. Artificial lakes and ponds of various sources are to be found scattered over the area. Cagle Mill reservoir is not shown on the map because it was constructed since date of the photography.

Ditches have been constructed where it is necessary to improve drainage conditions. These occur in the nearly flat areas.

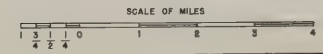
Stream gaging stations are located on White River at Spencer and on Mill Creek at Cataract (12). The drainage area of White River above Spencer is about 2,980 square miles (12).

Note: The drainage map was prepared from 1939 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1949.



DRAINAGE MAP OWEN COUNTY INDIANA

PREPARED FROM
1939 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1949



POLYCONIC PROJECTION

PARKE COUNTY

GENERAL NATURE OF THE COUNTY

Parke County is in the west-central part of the state. Its area is approximately 451 square miles (1). Rockville, the county seat, is 60 miles west of Indianapolis.

Average annual precipitation is 39.21 inches at Rockville (2). An average annual snowfall of less than 20 inches can be expected.

The northern and extreme western part of Parke County lies within the Tipton Till Plain physiographic region of the state. The eastern third of the southern part is in the Crawford Upland. The remainder is in the Wabash Lowland (3). In respect to its physiographic situation in the United States, the county is in the Till Plains section of the Central Lowland province (3).

The surface of the county is that of a glacial plain broken by the valleys of the Wabash River, Sugar Creek, and Raccoon Creek and their tributaries. It is ridged by moraines. Maximum local relief is about 200 feet (3). Some morainic topography is hummocky. Distinct knolls are found north of Rob Roy. Till plain areas in the northern part are gently undulating. An island-like portion of upland exists in the southwest corner. The Wabash Valley is generally wide along the east side of the river; it is very prominent. Terraces and flood plains separate the river from its valley wall. Sugar Creek is deeply entrenched and the ground is rolling along its tributaries; relief is considerable. Illinoian drift uplands are fairly level. Wisconsin drift uplands are gently rolling to rolling. Morainic knolls are found across the northern part of the county.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock, in most of the county, consists of strata of Pennsylvania age. There are small areas in the eastern part where the uppermost strata are of Mississippian age. Exposures of shale occur in the western part. Massive sandstone is exposed along Sugar and Raccoon creeks. Limestone outcrops in the eastern part of the county; it has been quarried in a few places such as Coxville. Coal outcrops in scattered areas.

All Parke County was glaciated. The drift in the northern and western parts of the county is Wisconsin in age. The remainder is Illinoian in age. Drift materials are 100 feet or more in thickness in the Wabash Valley. It is sometimes difficult to trace the border between the two drifts. The Wisconsin drift border is attenuated in certain places and obscured by wind deposited materials in other places. Terraces of Wisconsin age exist in the Wabash Valley.

The county is crossed by sections of two morainic systems. The Shelbyville moraine is identified in the southwestern, central and eastern parts. A section of the Champaign morainic system extends from the central part of the northeastern corner. Morainic land forms blend with the effects of dissection in some places, while there is a close grouping of the drift knolls in other sections. The Shelbyville moraine between the Wabash River and Raccoon Creek is undulating and somewhat ridged. It is gently undulating in the eastern part. The Champaign moraine is a series of knolls.

The soils have been derived from glacial materials some of which have been reworked by wind and water (5)(51). Wisconsin drift soils belong to the Russell catena. Illinoian drift soils belong to the Cincinnati catena. Fox and Warsaw soils occur on the granular deposits. Loessial soils belong to the Alford catena. Sand areas have Princeton soils. Alluvial soils belong to the Genesee catena. Some depressions contain soils of high organic content. Upland subsoils are moderately to slowly permeable (6). Nearly level areas in the southeastern corner are very slowly permeable. River valley subsoils are mostly permeable.

Granular materials occur in the Wabash Valley terraces and along Sugar and Raccoon creeks (7). Main areas producing sand and gravel are located in the northwestern and central-western parts. Other areas are scattered in the eastern and southeastern parts. Gravel has been found along Coal Creek, Wabash Mill Creek, Leatherwood Creek, and Brush Creek. Deposits of sand are found on the terrace in the northwestern part; other deposits occur in the uplands adjacent to the valley of the Wabash. Streaks of sand occur in the flood plains of the principal streams.

Loess has been mapped as covering the central and western parts (20). A small lakebed exists southwest of Bloomingdale. A large muck deposit is found in the central-southern part of the county in the Raccoon Creek valley. There are a few scattered areas of muck in other parts of the county, including the Wabash Valley.

DRAINAGE FEATURES

Parke County is in two major drainage basins of the state. Most of the county is in the Wabash basin. Only the southeast corner is in the Eel subdivision of the White River basin (3).

The Wabash Valley acted as a glacial sluiceway (21). Surface drainage is best developed along the Wabash Valley and along Sugar and Raccoon creeks and their principal tributaries. The trend of drainage is westerly to the Wabash River which flows south. Crests of sections of moraines define watershed divides in the county. Some stream courses and some stream deflections appear to be attributed, at least partially, to the presence of the moraines. Increased densities in drainage patterns are noticeable in some portions of the morainic areas. The Raccoon and Little Raccoon creeks cross morainic areas. Streams in the central part of the county flow in a southerly direction. The large streams, Raccoon and Sugar creeks, cross the Wabash River terraces directly while lesser streams are deflected. The Sugar Creek valley is narrow except near the Wabash River and east of the Narrows. A few minor waterfalls exist in tributaries of Sugar Creek. The courses of the natural drainageways have been disrupted in some areas by strip mining operations for coal. With a few exceptions, tributaries entering Sugar Creek from the south are short. The Raccoon Creek valleys appear to be alluviated; their valleys are broad. Lack of surface drainage on the granular terraces is due to good internal drainage. A singular drainage feature is the northward course of Raccoon Creek in its lower reaches from near Rosedale. This may have been the result of the deposition of glacial materials. Some stream valleys are ravine-like, having very steep sides. The Sugar Mill Creek and Roaring Creek valleys are deep ravines near Sugar Creek. Rock is exposed in their valley walls. Other streams show the effects of rock control by their angular bends. Rock Fork Creek and South Raccoon Creek are deflected sharply.

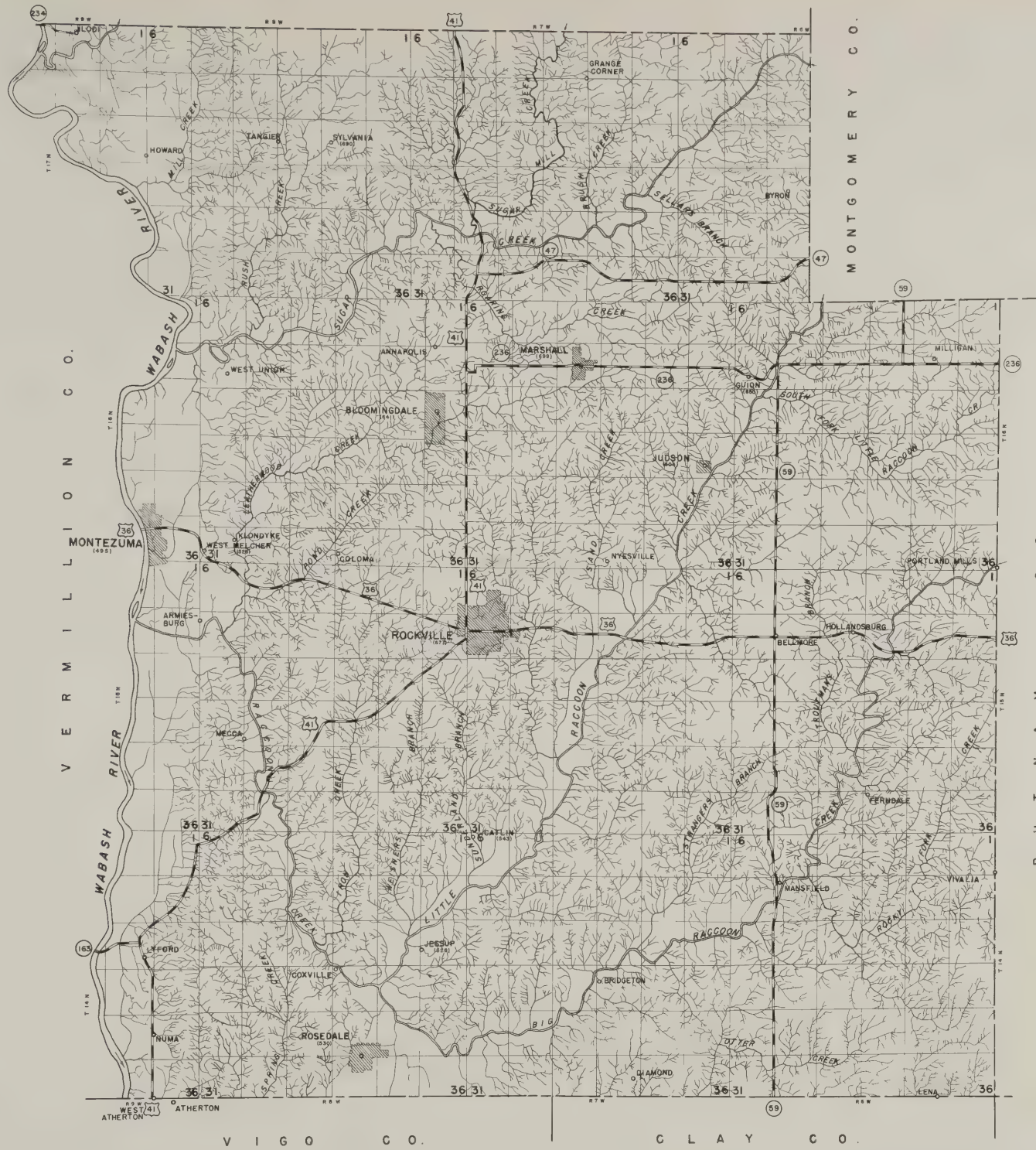
There are no natural lakes in the county. Ponds of various origins are scattered throughout the area.

Ditches have been constructed in the nearly level sections to improve sluggish drainage conditions. Stream gaging stations are located on Sugar Creek near Byron and on Big Raccoon Creek at Mansfield (12). A stream gaging station is located on the Wabash River at Montezuma.

The drainage area of the Wabash River above Montezuma is about 11,200 square miles. The drainage area of Sugar Creek is about 840 square miles; and of Raccoon Creek it is about 530 square miles (11). The drainage area of Raccoon Creek above Mansfield is about 252 square miles (12). The drainage area of Sugar Creek above Byron is about 678 square miles (12).

Note: The drainage map was prepared from 1939 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1946.

F O U N T A I N C O .

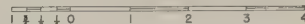


DRAINAGE MAP
PARKE COUNTY
INDIANA

PREPARED FROM
1939 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY

1946

SCALE OF MILES



POLYCONIC PROJECTION

PERRY COUNTY

GENERAL NATURE OF THE COUNTY

Perry County is located in the southern part of the state. Its area is approximately 384 square miles (1). Cannelton, the county seat, is 130 miles southwest of Indianapolis.

Mean annual precipitation is 42.00 inches at Tell City and 45.98 inches at Rome (2). An average annual snowfall of from 15 to 20 inches can be expected.

Perry County lies wholly within the Crawford Upland Physiographic region of the state (3). In respect to its physiographic situation in the United States, it is a part of the Highland Rim Plateau section of the Interior Low Plateaus province (3).

Perry County is considered to have more diversity of relief than any other county in the state. It is a highly dissected upland. The valleys contain the only nearly level land. Maximum local relief is about 325 feet (3). Alluvial lands are broad near Tobinsport. A few sinkholes are to be found on the tops of some of the ridges in the eastern part of the county. A prominent filled valley is occupied by Anderson River. Shale strata give bench-like topography in certain areas.

Surface and near surface geologic ages recognized in the county are the Quaternary period and the bedrock formations (4). Bedrock, in the eastern part of the county, consists of strata of Mississippian age. Those in the western part are of Pennsylvanian age. The rocks consist of limestones, sandstones, shales, and coals; they outcrop throughout the upland at various levels depending upon their relative positions.

Perry County is in the unglaciated region of the state (3). The effects of glaciation consist of Ohio River terraces and lakebeds along Anderson River and some of its larger tributaries.

The soils of the county have been derived from residual and water-deposited materials (5). Sandstone soils belong to the Zanesville catena. Soils of the Wheeling catena occur in the Ohio Valley. Alluvial soils belong to the Huntington and Pope catenas. A few depressions have soils of high organic content. Upland subsoils are slowly permeable (6). River valley subsoils are mostly permeable.

Sands and gravels have been found in the valley of the Ohio River and obtained from the river bars near Cannelton and Tell City (7). Cherty gravels cap the bluffs in the vicinity of Rome. Sand streaks are found in the flood plains. Lacustrine deposits occur along streams entering the Ohio River.

DRAINAGE FEATURES

Perry County lies wholly within the Minor Ohio drainage basin of the state (3).

The Ohio River makes a series of loops along the southern part of the county. In the meandering north-south portions of their courses Anderson River, Middle Fork Anderson River, and Oil Creek appear to be strike streams. The course of the Ohio River appears to be controlled by resistant rock strata along the eastern side of the county. Anderson River forms much of the western boundary. The Ohio River acted as a glacial sluiceway. Many streams have their origin along the watershed divide that extends from near the center to the northern part of the county. Bear Creek and Windy Creek are deflected near the Ohio River. Deer Creek appears to have had a preglacial channel (9). Surface drainage systems in the uplands are thoroughly developed; there is little level land. Stream gradients are high in most of the county. Drainage is integrated in many areas.

There are no natural lakes in Perry County. A few farm ponds have been mapped and some water-filled depressions occur in the bottom lands along the Ohio River.

There are relatively few ditches in the uplands of the county. Some have been constructed in the lakebed areas.

The drainage area of the Ohio River above Tell City is about 96,750 square miles (12).

Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1951.



PIKE COUNTY

GENERAL NATURE OF THE COUNTY

Pike County is located in the southwestern part of the state. Its area is approximately 335 square miles (1). Its county seat, Petersburg, is 110 miles southwest of Indianapolis.

From data collected in surrounding counties, the mean annual precipitation should be about 42 inches (2). An average annual snowfall of about 25 inches can be expected.

Pike County lies wholly within the Wabash Lowland physiographic region of the state (3). In respect to its physiographic situation in the United States, the northwestern third of the county is in the Till Plains section of the Central Lowland province. The remainder of the county is in the Interior Low Plateaus province (3).

The topography of the county is diversified. Bordering the East Fork White River the surface is dissected, but farther south it is gently rolling. South of the Patoka River the land is hilly; the divides are high and irregular. The county is partially a glacial plain and partially a residual plain. Maximum local relief is about 180 feet (3). The aggraded valleys are nearly level. A circumalluviated hill is found near Stendal. The southeast part is rough and highly dissected, especially southeast of Augusta. Till plain areas are moderately rolling. The glacial lakebed is an almost featureless plain. West of Spurgeon are some long, smooth, rounded hills. The southeastern third of the county has deep V-shaped valleys. The divide between the Patoka and East Fork White rivers is fairly level. South of the Patoka River, occasional individual hills rise above the general surface. In the glaciated section many ridges are broad and rounded. The surface is somewhat subdued as compared to that of the unglaciated area. Shale benches give a step-type appearance to the landscape in some areas.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock consists of strata of Pennsylvanian age. Rock outcrops in many section of the county. Coal outcrops in several places.

The northwestern part of Pike County (about one-third of its area) has been glaciated (3). The remainder is a portion of the unglaciated region of the state. The glacial drift is Illinoian in age. The drift is thin near its border. Aeolian materials have been masked by the drift in other places. The only morainic expression is produced by some low knolls which are found along the border. The drift is thickest in the lowlands. The drift border lies a short distance north of the Patoka River, and is rather indistinct in certain localities due to the removal of the drift by erosion. There are no moraines.

The soils of Pike County have developed from the weathering of sandstone and shale, Illinoian glacial drift, loess, lacustrine deposits and recent alluvium (5). Sandstone soils belong to the Zanesville catena. Gibson soils are Illinoian drift soils. Loessial soils are of the Alford catena. Sand areas have Princeton soils. Lacustrine soils belong to the Otwell catena. Alluvial soils belong to the Genesee and Pope catenas. In the northwestern part, subsoils are moderately to slowly permeable (6). In the remainder of the county the subsoils are slowly permeable. Loessial and sandy area subsoils are mostly permeable. River valley subsoils are mostly permeable.

Gravel has been obtained from bars in the White River (7). Deposits of local rock fragments are found in some streams. Some sand and gravel has been found along the drift border. Sand deposits occur in the uplands immediately adjoining the White River valley. Sand streaks occur in the flood plains. A glacial lakebed exists near Cato. The lacustrine deposits are in glacial lake Patoka. Remnants of beach ridges are found in some areas. Deposits of deep loess have been mapped in a wide band south of White River and East Fork White River (29). Also, there is an area south of Patoka River in the west-central part of the county which is covered by loess (20).

DRAINAGE FEATURES

Pike County lies within three drainage basins of the state (3). The southern part is in the Minor Ohio basin. The central part is in the Patoka basin. The northern fourth is divided between the White River basin proper and the East Fork White subdivision of this basin.

The White and East Fork White rivers acted as glacial sluiceways. Preglacial watershed divides occur in the northern and eastern parts. The southeasterly course of Flat Creek is noticeable. Cup Creek flows in a northerly direction. The Patoka River is a sluggish stream flowing through an aggraded valley except in the eastern part where it flows in a narrow deep valley. Its course is meandering in the eastern part. The lower portion of the valley of South Fork Patoka River is aggraded, also. Surface drainage is thoroughly developed in the uplands. Erosion has been active. Upland drainage is integrated in many places. Lakebed stream gradients are low. Stream gradients are high in the southeastern part. Drainage patterns are fine-textured in most of the dissected uplands. The courses of the natural drainageways have been disrupted in many places due to strip mining operations. In the northeastern part streams draining into the East Fork White River are small. Likewise, most tributaries of the Patoka River from the north are small. Flat Creek drains an old lakebed; it has a low gradient.

There are no natural lakes in Pike County. Water-filled strip mines, farm ponds, reservoirs, and bottom land bayous have been mapped.

Ditches have been dredged in the lakebed areas and some of the larger streams have been straightened by dredging. The Patoka River has been dredged in the western part. The abandoned meanders of Patoka River exist in the flood plain.

A stream gaging station is located on White River at Petersburg (12). The drainage area of White River above Petersburg is about 11, 100 square miles (12).

Note: The drainage map was prepared from 1938 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1953.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP PIKE COUNTY INDIANA

PREPARED FROM
1937 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1953

SCALE OF MILES
0 1 2 3 4

PORTER COUNTY

GENERAL NATURE OF THE COUNTY

Porter County is located in the northwestern part of the state. Its area is approximately 425 square miles (1). Valparaiso, the county seat, is 130 miles northwest of Indianapolis.

Mean annual precipitation is 35.17 inches at Valparaiso (2). An average annual snowfall of 40 inches can be expected.

The northern third of Porter County lies within the Calumet Lacustrine section of the Northern Moraine and Lake physiographic region of the state (3). The southern third is in the Kankakee Lacustrine section and the central part is in the Valparaiso Moraine section of the region (3). In respect to its physiographic situation in the United States, the county is in the Eastern Lake Section of the Central Lowland province (3).

The surface of the county is that of a glacial plain modified by aeolian and glacio-fluvial action. It is broken by the valleys of the principal streams. Its morainic ridges are conspicuous. The outwash plains are nearly flat to gently rolling. High sand dunes lie adjacent to the beach of Lake Michigan. Maximum local relief is about 190 feet (3). The lacustrine plains in the northern part have been outlined by beach ridges. The moraine in the vicinity of Valparaiso has many knolls and sags. Shallow basins are numerous. The Kankakee valley is wide, with gently sloping sides. Stream valleys are shallow in the outwash plain areas.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). The Quaternary deposits are both Pleistocene and recent in age. Bedrock, in most of the county, consists of strata of Devonian age. In a small area in the southwestern part of the county they are of Mississippian age. Rock is not known to outcrop in the county.

All Porter County was glaciated. Surface drift is Wisconsin in age (3). The drift varies in depth according to the preglacial bedrock topography, being more than 200 feet deep in some locations (4). The Valparaiso moraine crosses the central part of the county in a northeast-southwest direction; it is more or less a single band of ridged drift (9). A small but distinct ridge in the northeastern part has been considered a section of a lake border moraine. In the western part, the Valparaiso moraine is mostly clay in composition while it contains much granular material in its eastern part. There is little variation in the altitude of the moraine.

The mineral soils of the county have been derived from glacial materials (5). The materials have been reworked by wind and water. Upland soils belong to the Miami catena. Sand areas have Allendale soils. Soils of the Lucas catena are lacustrine. Griffin soils are alluvial. Mucks occur in the basins. In the central part, subsoils vary from permeable to slowly permeable depending upon the topography (6). Sandy areas have very permeable subsoils.

There are some granular deposits in the morainic areas (7). The drift contains much granular material in the outwash plains. Areas producing sands and gravels are located mostly in the northwestern and

southeastern parts with scattered areas near the central part. Subsurface deposits of granular materials occur, especially in the morainic areas. Sand dunes occur along Lake Michigan and a few miles from the shore; sand plains occur in the southern part. Lacustrine areas occur in the northwestern part, including sections of the Salt Creek and Calumet River drainage basins. Muck channels are common in the morainic areas.

DRAINAGE FEATURES

The northern half of Porter County is in the Calumet drainage basin of the state. The southern part is in the Kankakee basin (3).

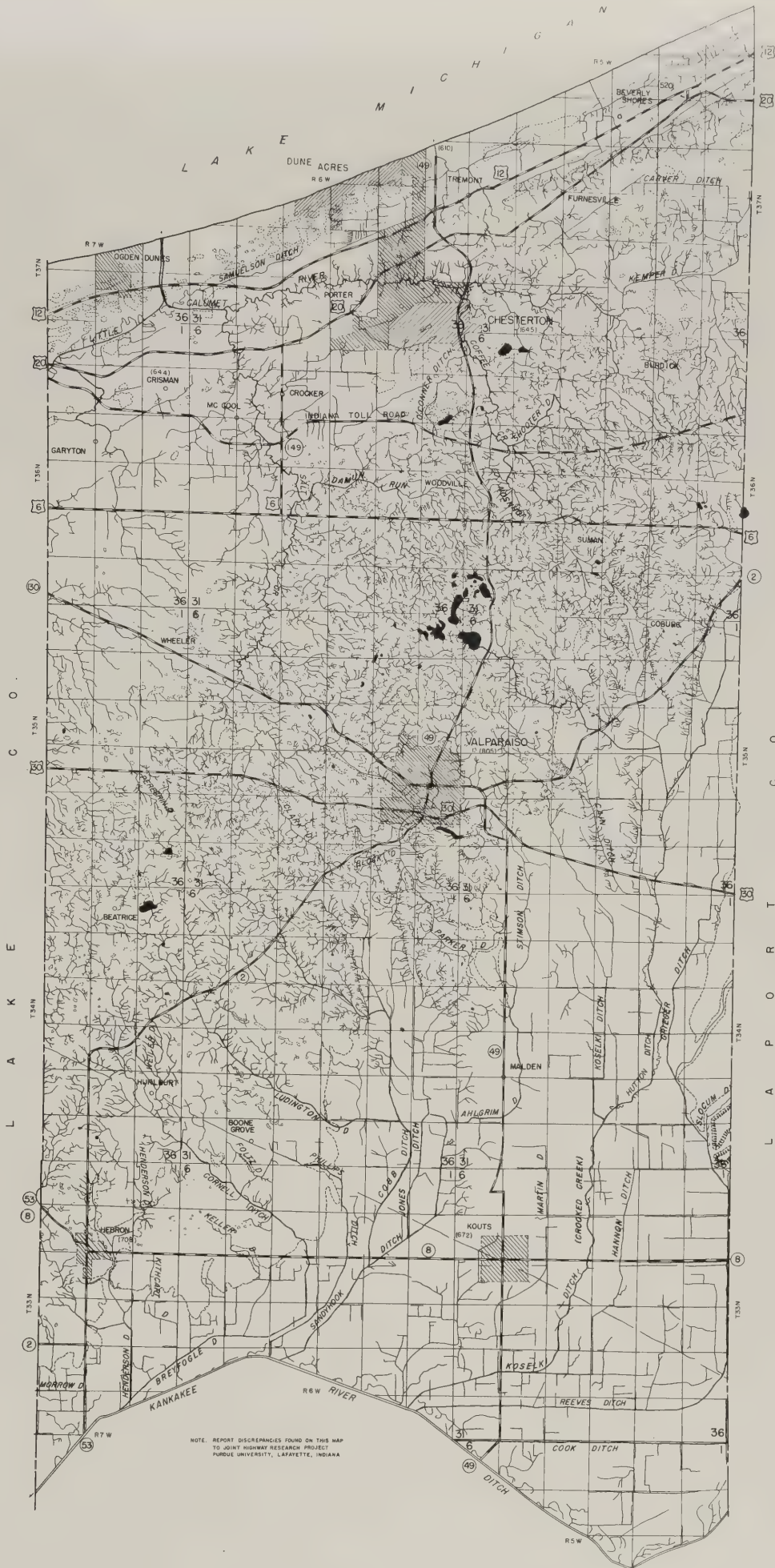
Lake Michigan borders the county on the north. Streams in the southwest part have rather low banks. The Kankakee River Ditch has a low gradient. Most of the streams of the county, except the Little Calumet and Kankakee rivers, have their sources on or near the crest of the Valparaiso moraine. The moraine defines the watershed divide. Some stream courses and some stream deflections can be attributed, at least partially, to the presence of the moraine. The Valparaiso moraine can be outlined approximately by the fine-textured, though hap-hazard, drainage patterns of its streams. The outwash plain is more or less outlined by long, nearly parallel southerly flowing streams; those in the western part, having a southeastern trend. Outwash plains have excellent internal drainage; therefore, surface drainage is weakly developed. Natural drainage is perhaps best developed along streams in the morainic area. Southeast of Valparaiso outwash stream valleys are broad and shallow. Basins exist in the outwash plains. The course of the Little Calumet River was apparently controlled by the presence of morainic and beach ridges. The Little Calumet has a low gradient; it resembles a canal. Only a very few short streams enter Lake Michigan directly.

Several small lakes occur within the limits of the Valparaiso moraine. Ponds of various origins, also, are found throughout the area. The lakes tend to stabilize the flow of their outlet streams. Gaging stations are located on Flint, Long, Loomis and Wauhab lakes (12).

The Little Calumet River is connected to Lake Michigan through Burns Ditch. Discharge of its waters into the lake is determined by flood conditions along its course. Numerous other ditches have been constructed, both in the southern and northern parts, the principal one being the Kankakee River Ditch. Remnants of the old stream exist in the many oxbows near the present channel. Surface drainage of muck and peat areas is effected by ditching.

Stream gaging stations are located on Little Calumet River at Porter and on Salt Creek near McCool (12). The drainage area of Salt Creek about McCool is about 73 square miles (12).

Note: The drainage map was prepared from 1938 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1948.



NOTE. REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP PORTER COUNTY INDIANA

PREPARED FROM
1938 AAA AERIAL PHOTOGRAPHS
BY
STATE HIGHWAY COMMISSION OF INDIANA
AT
PURDUE UNIVERSITY
1948



POSEY COUNTY

GENERAL NATURE OF THE COUNTY

Posey County is located in the southwest corner of the state. Its area is approximately 414 square miles (1). Mt. Vernon, the county seat, is 160 miles southwest of Indianapolis.

Mean annual precipitation is 42.22 inches at Mt. Vernon, 41.55 inches at Stewartsville, and 39.56 inches at New Harmony (2). Average annual snowfall is not expected to exceed 15 inches.

Posey County lies wholly within the Wabash Lowland physiographic region of the state (3). In respect to its physiographic situation in the United States, the northern half of the county is in the Till Plains section of the Central Lowland province and the southern part is in the Interior Low Plateaus province (3).

The surface of Posey County varies from the nearly level alluvial lands bordering the Ohio and Wabash rivers to the rolling uplands of the interior. Maximum local relief is about 160 feet (3). The Wabash and Ohio river bottoms are very nearly flat, with occasional depressions and low ridges. Posey County has a maximum elevation below 600 feet (3). Terraces of Wisconsin age occur in the Wabash and Ohio valleys. The minimum altitude in the state, 313 feet above sea level, occurs at the mouth of the Wabash River in the southwestern part of the county (3). Low, rolling hills border alluviated valleys. In places the rise between the lowlands and the uplands is abrupt. Most all the aggraded valleys are too wide for the streams which occupy them. Isolated hills occur in the Wabash Valley. The Black River valley floor is broad and nearly level. Cut-offs in the Wabash River have isolated portions of Indiana and Illinois into island-like tracts.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock consists of strata of Pennsylvanian age. The formations are shales, sandstones, and limestones. They outcrop in various parts of the upland; e.g., limestone is exposed along the Wabash River southwest of New Harmony. Another outcrop of limestone is at West Franklin. Coal outcrops in the uplands in the northwestern part of the county.

The northwestern half of the county was glaciated (3). The drift is Illinoian in age. The drift border may be somewhat obscured by loessial deposits. In most places the drift along the border is thin. Some of the drift material has been removed by erosion. Some low knolls are found in the northeastern part of the county; otherwise, there is little indication of morainic deposition (9). The drift is thickest in the lowlands and in subsurface preglacial valleys.

The soils of the county have been developed from residual, glacial, aeolian, and water-deposited materials (6). Sandy soils belong to the Princeton catena. Gibson soils are Illinoian. Loessial soils belong to the Alford catena. Fox soils are found on the granular deposits. Soils of the Wheeling catena occur in the Ohio Valley. Alluvial soils are of the Genesee and Huntington catenas. Some depressions have soils of high organic content. Uplands in the eastern part have moderately to slowly permeable subsoils (6). Subsoils in areas of deep loess and in river valleys are mostly permeable. Glacial lakebed subsoils are slowly permeable.

Granular materials occur in Wabash River bars (7). Sand and gravel have been found in the flood plains of the Wabash and Black rivers. Areas producing sands and gravels are located in the northwestern, southeastern, and central-western parts. Sands occur along the bluffs of the Wabash and Black rivers and in ridges and small mounds on their alluviated valley floors. Sand streaks exist in the flood plains. Loessial deposits are the surface materials in many parts of the uplands. Deep loess has been mapped as covering the hills in these sections (20). Lacustrine deposits occur along streams entering the Ohio and Wabash rivers. Much of the valley fill of these two river systems is alluvial in nature.

DRAINAGE FEATURES

Even though the northern and central parts of the county drain into the Wabash River, Posey County has been included in the Minor Ohio drainage basin of the state (3).

The county is bounded on the west by the Wabash River and on the south by the Ohio River. The Wabash and Ohio valleys were glacial sluiceways. These preglacial valleys have been aggraded. The flood plains of the Ohio and Wabash valleys are quite wide in places. Flood water flumes mark the valley floors. Streams flowing in the Wabash River have aggraded valleys which extend for some distances into the upland areas. Also, streams entering the Ohio River have aggraded valleys near the river. Natural drainage is best developed in the upland areas. Drainage patterns are fine-textured in the dissected uplands. Drainage is integrated in many sections. Subsurface preglacial valleys exist in the northern part (9). Noticeable is the abrupt changes in the course of Big Creek in its upper reaches, the curving course of Black River, and the meandering course of Cypress Creek. The deflected courses of Big Creek and Black River are probably the result of glaciation. Gresham Creek is deflected near New Harmony. Alluvial bottom lands are marked by long, nearly parallel intermittent drainageways. Filled, abandoned meanders occur throughout the river valleys. Most streams entering the Ohio River are short. Near Cynthiana the Big Creek valley is through a low ridge. The Wabash River flows against the valley wall at a point south of New Harmony. In the southern part, streams entering the Wabash River are short.

The lakes of the county are the water-filled abandoned meanders, or bayous, such as Hovey Lake. They are found near the Ohio and Wabash rivers. Ponds of various origins are scattered throughout the area.

Ditches have been dredged in the alluviated sections of the county. Natural drainage is supplemented by artificial means.

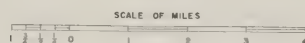
A stream gaging station is located on the Wabash River at New Harmony (12). The drainage area of the Wabash River at its junction with the Ohio River is about 33,100 square miles (11). This includes numerous watersheds in Ohio and Illinois since the drainage area of the Wabash in Indiana is approximately 24,200 square miles (12). The drainage area of the Ohio River above Mt. Vernon is about 129,200 square miles (12).

Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1953.



DRAINAGE MAP
POSEY COUNTY
INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1953



PULASKI COUNTY

GENERAL NATURE OF THE COUNTY

Pulaski County is in the central-northern part of the state. Its area is approximately 433 square miles (1). Winamac, the county seat, is 90 miles north-northwest of Indianapolis.

Mean annual precipitation is 35.95 inches at Winamac (2). An average annual snowfall of about 25 to 30 inches can be expected.

Almost all Pulaski County lies within the Kankakee Lacustrine section of the Northern Moraine and Lake physiographic region of the state (3). Only a very small area in the northeastern part is included in the Steuben Morainal Lake section of the region. In respect to its physiographic situation in the United States, the county is in the Eastern Lake section of the Central Lowland province (3).

The surface of the county is that of a glacial plain dissected by the principal streams and modified by wind and water action. Maximum local relief is about 45 feet (3). Pulaski County is the most nearly level one in the state as its maximum relief is 90 feet or less (3). Sandy areas in the southeastern part are nearly flat except for dunes. The Tippecanoe and Kankakee watershed divide is nearly level. Underlying materials influence features of the sand plains, especially where the sand is thin on drift.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock in the southern third of the county consists of strata of Silurian age. In the northern part they are of Devonian age. Rock is at, or near, the surface in the southwestern part of the county. Limestone has been quarried near Francesville.

The Marsailles moraine extends into the northwestern corner of the county in a very limited area (10). It merges with a sand plain. Small sections of the Maxinkuckee moraine are found in the northeastern part.

The soils of the county have been derived from glacial materials, many of which have been reworked by wind and water (5). Upland drift soils belong to the Miami, Parr, and Metea catenas. Maumee, Berrien, Plainfield, and Newton soils have been formed on the sand deposits. Organic soils are mucks and/or peat. Small areas of semi-granular drift are found in the county. The subsoils in the sandy or gravelly areas are very permeable (6). Permeable subsoils exist in the southeast corner. Moderately to slowly permeable subsoils exist in areas of the southwest part.

Granular materials, other than the sands, are scattered (7). A plain of granular material lies in the northeastern part. Areas producing sand and gravel are located in the northeast and southeast parts. Pulaski County has extensive sand areas. Numerous sand dunes and ridges have been superimposed on the sand plains. The ridges show a north-south trend. There is a sandy tract in the southeastern part. An east-west sand ridge lies north of Indian Creek. A sandy tract lies east of the Tippecanoe River.

• DRAINAGE FEATURES

The north-central and northwestern part of Pulaski County are in the Kankakee drainage basin of the state (3). The remainder is in the Tippecanoe subdivision of the Wabash drainage basin.

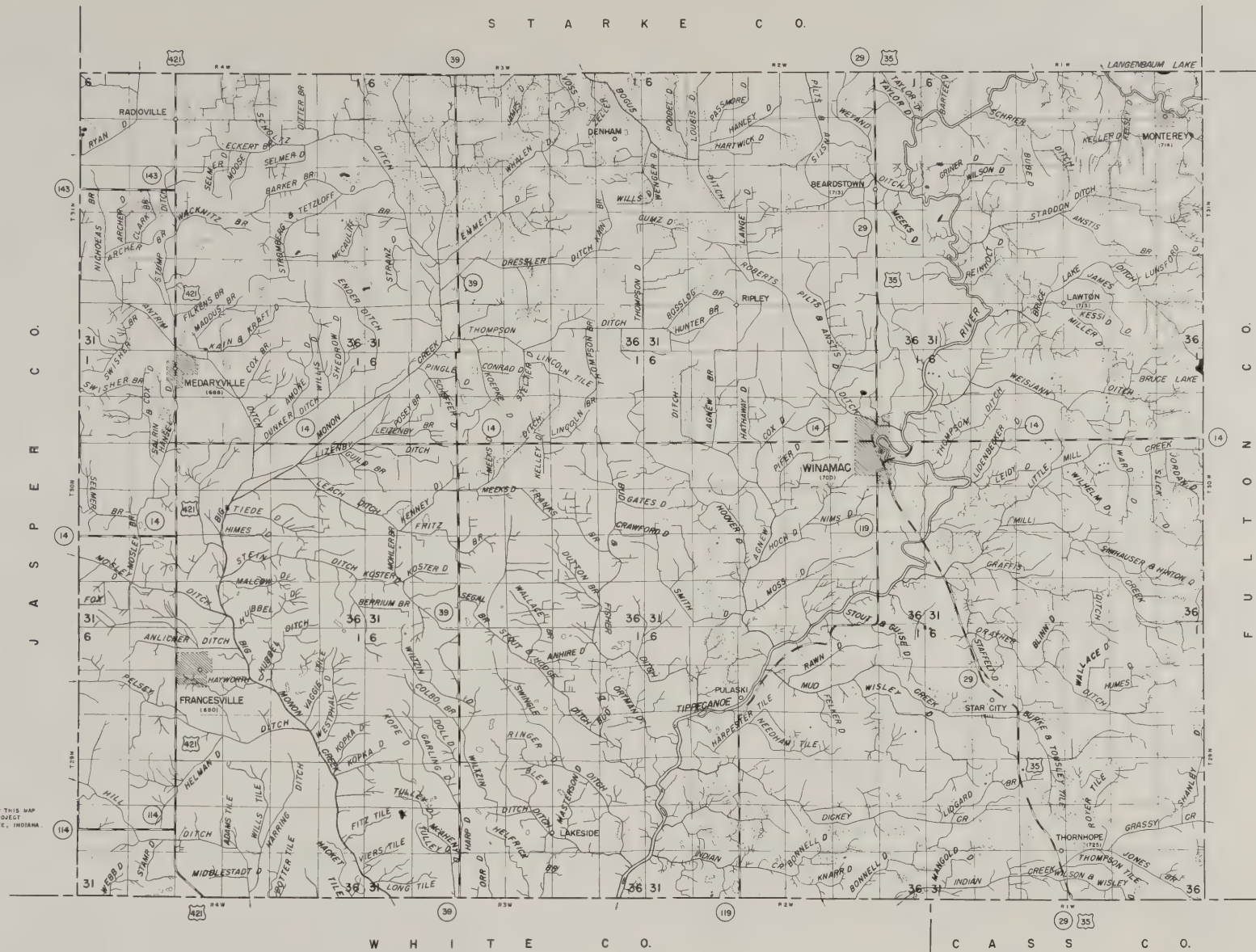
The Tippecanoe River valley is shallow in the county. The river has a low gradient. The river meanders freely. Surface drainage is best developed along the Tippecanoe River although in most of the county natural drainage is weakly developed. Local depressed areas are found in nearly all parts of the county. Crests of sections of moraines in the county define local watershed divides. The watershed divide in the western part may be due in part to the bedrock. Drainage patterns conform to topography and surface materials of the morainic area. The Tippecanoe River crosses a morainic area in the northeastern corner. The course of Bogus Creek is deflected from a southerly flowing stream to a northerly one. Streams in the eastern part of the county have a westerly trend. The change in direction of the Tippecanoe River is perhaps due to glaciation; its course is through a series of boulder strewn depressions. Monon Creek flows through a district lower than the Tippecanoe River.

There are only two sizeable lakes in the county and these are shared by adjacent counties. A number of small lakes and ponds of various origins have been mapped. A gaging station is located on Bruce Lake (12).

Many ditches have been constructed to improve drainage conditions. Even Monon Creek has been dredged. Surface drainage of muck and peat areas is effected by ditching.

The drainage area of the Tippecanoe River above Pulaski is about 1,100 square miles (12).

Note: The drainage map was prepared from 1939 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1946.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA.

DRAINAGE MAP PULASKI COUNTY INDIANA

PREPARED FROM
1938 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1955



POLYCONIC PROJECTION

DRAWN BY: H. Y. FANG

PREPARED UNDER THE SUPERVISION OF: P. T. YEH

PUTNAM COUNTY

GENERAL NATURE OF THE COUNTY

Putnam County is located in the west-central part of the state. Its area is approximately 490 square miles (1). Greencastle, the county seat, is 40 miles west-southwest of Indianapolis.

Mean annual precipitation is 42.21 inches at Greencastle (2). An average annual snowfall of about 20 inches can be expected.

With the exception of the southwestern part, about two-thirds of Putnam County lies within the Tipton Till Plain physiographic region of the state (3). This southwestern third, however, is in three physiographic regions. Progressively from east to west they are: the Mitchell Plain, the Crawford Upland, and the Wabash Lowland. In respect to its physiographic situation in the United States, the county is in the Till Plains section of the Central Lowland province (3).

The surface of the county is that of a glacial plain broken by the valleys of Raccoon, Walnut, and Mill creeks and their tributaries. Stream bluffs are less than 100 feet high in general. Maximum local relief is about 180 feet (3). Three relatively flat upland areas exist in the county, one in the northeastern part, one southeast of Cloverdale, and one in the central-western part (52). The highest point is near Bainbridge and the lowest point is in the Eel River bottoms in the southwest corner of the county. The terrain is undulating and ridged in the east-central part. Sinkholes exist in various places in the southern half of the county. These give a pitted appearance to the terrain. The most rolling section is in the southwestern part.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock in the west-central part of the county consists of strata of Pennsylvanian age. In the remainder of the county they are of Mississippian age. There are frequent outcrops of rock especially in the southern part. Limestone has been quarried in many places. Sandstone occurs in the western part of the county near Fern.

All Putnam County was glaciated (3). The southwestern third of the county is covered with Illinoian glacial drift. The remainder is mantled with Wisconsin drift. The drift is thicker in the northern part than in the southern part. Sections of the Shelbyville moraine cross the central part of the county in an east-west direction. The drift border is indistinct in some parts, but is marked by a low ridge in the southeastern part; west of Greencastle the drift border is gently undulating.

Soils have been developed from glacial and fluvial materials (5) (52). Soils of the Russell catena occur in the uplands of the Wisconsin drift covered area. Soils of the Cincinnati catena occupy the upland Illinoian drift areas. Alluvial soils are of the Genesee catena. Fox soils occur on the granular deposits. Some soils of the Princeton catena occur in the sand areas. Some depressions have soils of high organic content.

In the southwestern third of the county the subsoils are slowly to very slowly permeable (6). In the remainder of the county they are moderately to slowly permeable depending upon the terrain. River valley subsoils are mostly permeable.

Granular deposits have been found along Raccoon River, Big Walnut Creek, Ramp Creek and Deer Creek (7). Areas producing sand and gravel are found in the eastern, central-western, and southwestern parts of the county. There is a granular ridge in the east-central part of the county. Some terraces exist in the southwest corner.

Several small windblown sand deposits are found along Mill Creek. Mill Creek drains an old lakebed.

DRAINAGE FEATURES

The northwestern part of Putnam County is in the Wabash drainage basin of the state (3). The remainder of the county is in the White River basin.

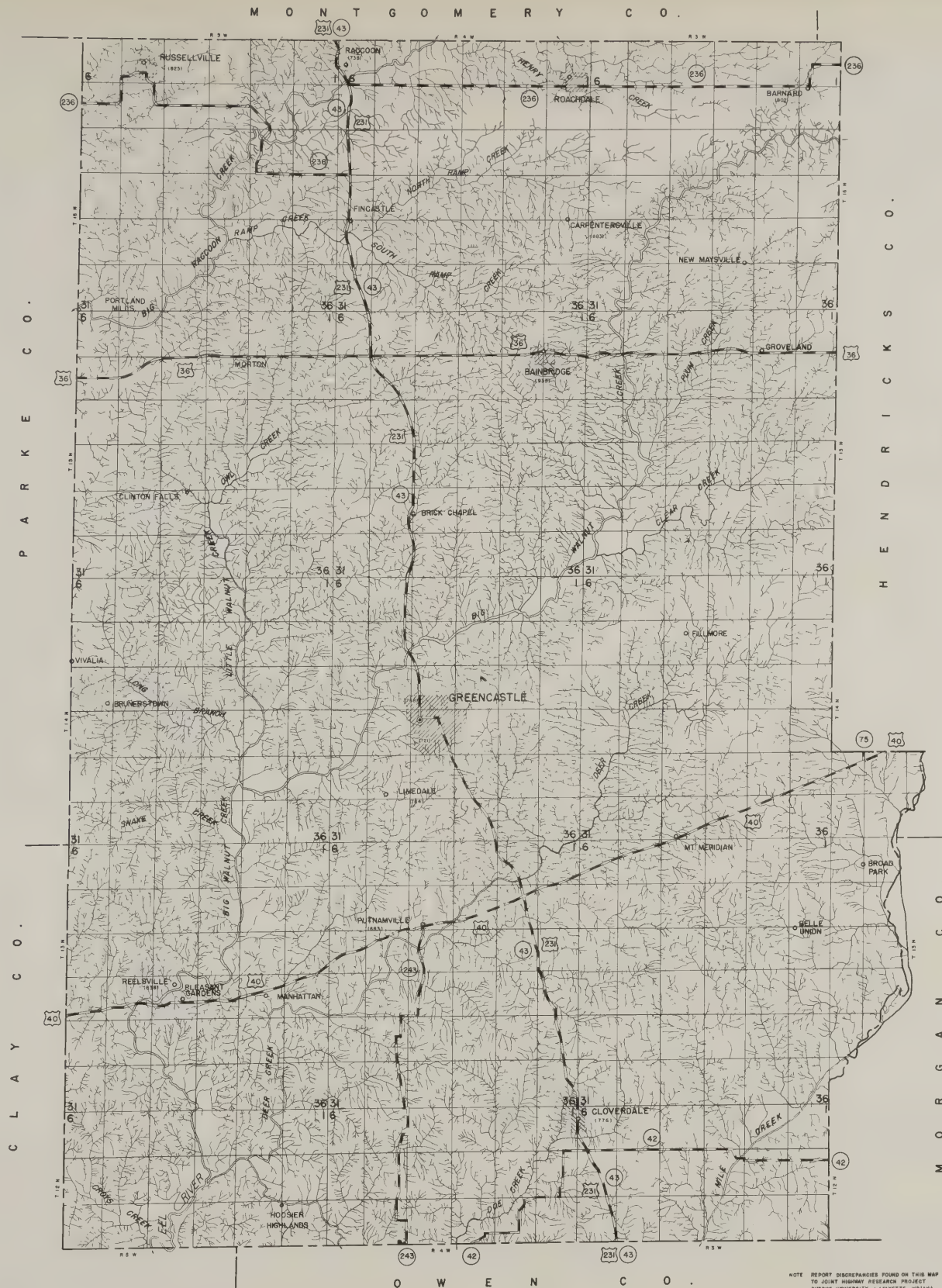
Natural drainage is best developed along the valleys of the principal streams. Drainage lines are controlled to a large extent by the underlying rock strata, especially in the southern part. The north-south portions of the courses of Walnut, Little Walnut, and Deer creeks show the effects of rock control. Big Raccoon Creek, also, is deflected south in the northwest corner of the county. Crests of sections of moraines define local watershed divides. Some stream control and some stream deflection may be attributed, at least partially, to the presence of the moraine. Little Walnut Creek crosses a morainic area. This southerly flowing stream may be rock controlled. The valley walls of some streams are steep. The flood plains of the principal streams are fairly wide in places. Clear Creek crosses a granular ridge in the eastern part of the county. In the southwestern part, Eel River valley and those of its major tributaries are considered as having acted as Wisconsin glacial sluiceways. The present course of Mill Creek is probably due to the effects of glaciation.

Ditches have been constructed, particularly in the lakebed areas. Some of the streams have been dredged and their courses straightened, e.g., Mill Creek in the southeastern part of the county.

There are no natural lakes in the county. Cagle Mill reservoir is not shown because it was constructed after date of the photography. Ponds of various origins are scattered throughout the area.

A stream gaging station is located on Big Walnut Creek near Reelsville and on Mill Creek near Manhattan (12). The drainage area of Big Walnut Creek above Reelsville is about 320 square miles (12).

Note: The drainage map was prepared from 1938-1939 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1955.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP PUTNAM COUNTY INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1952



REDRAWN BY: M. DENNEY

POLYCONIC PROJECTION

PREPARED UNDER THE SUPERVISION OF: M. PARVIS

RANDOLPH COUNTY

GENERAL NATURE OF THE COUNTY

Randolph County is in the eastern part of the state. Its area is approximately 457 square miles (1). Winchester, its county seat, is about 70 miles east-northeast of Indianapolis.

Mean annual precipitation is 38.54 inches at Farmland (2). An average of 25 to 30 inches of snow can be expected annually.

Randolph County lies wholly within the Tipton Till Plain physiographic region of the state (3). In respect to its physiographic situation in the United States, the county is in the Till Plains section of the Central Lowland province (3).

The surface of Randolph County is that of a glaciated plain. It is broken by the valleys of the Mississinewa and White Rivers and their tributaries and by the headwater streams of the Whitewater River system. Moraines add relief in belts along the northern side, east and west through the central part, and in the southern part of the county. Maximum local relief is about 140 feet (3). Randolph County is one of the three counties in Indiana with an average altitude of over 1,000 feet (3). The highest point in the state, 1,285 feet above sea level, is in the southeastern part of the county, east of Lynn. This high point is due in part to morainic knolls and in part to the elevation of the bedrock. Streams flow in nearly every direction from this point of highest elevation. Occasionally low mounds and low, nearly flat ridges occur (53). The most rolling country exists in the southwest corner. Intermorainic, interstream areas are gently undulating. Bottom lands are relatively narrow in most parts.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary deposits are both Pleistocene and recent in age. Bedrock strata are of Silurian age. There are rock outcrops in the central, western, and north-central parts of the county, especially along the Mississinewa River. Limestone, also, outcrops along White River in the western part of the county. Limestone is exposed at Ridgeville.

All Randolph County was glaciated (3). The drift is Wisconsin in age. The drift is as much as 200 feet thick in some areas. The county is crossed from east to west by three morainic system -- the Bloomington in the southern part, the Union City in the central part, and the Mississinewa in the northern part (8). The highest point in the state is located in the area covered by the Bloomington moraine. Morainic materials add to the height established by the bedrock.

The soils have been mostly developed from glacial and fluvial materials (5)(53). Except in areas where the drift is very thin, underlying limestone has had little effect on soil formation. Upland soils belong to the Miami and St. Clair catenas. Some Fox soils are found on the granular deposits. Bottom land soils belong to the Genesee catena. Muck occurs in small areas, mostly in the southeastern part. Clyde soils occur in depressions. The subsoils of the northern third of the county are slowly to very slowly permeable (6), depending upon the topography. In the central and southern parts, the subsoils vary from moderately to slowly permeable.

Granular deposits have been found along the main streams and in knolls and ridges (7). Areas producing sands and gravels are located in the central, central-northern, eastern, and central-southern parts of the county.

DRAINAGE FEATURES

The northern part of Randolph County is in the Mississinewa subdivision of the Wabash drainage basin of the state (3). The central part is in the White River drainage basin. The southern part is in the White-water drainage basin. The central-eastern part drains into Ohio and is a part of the Miami drainage basin in that state.

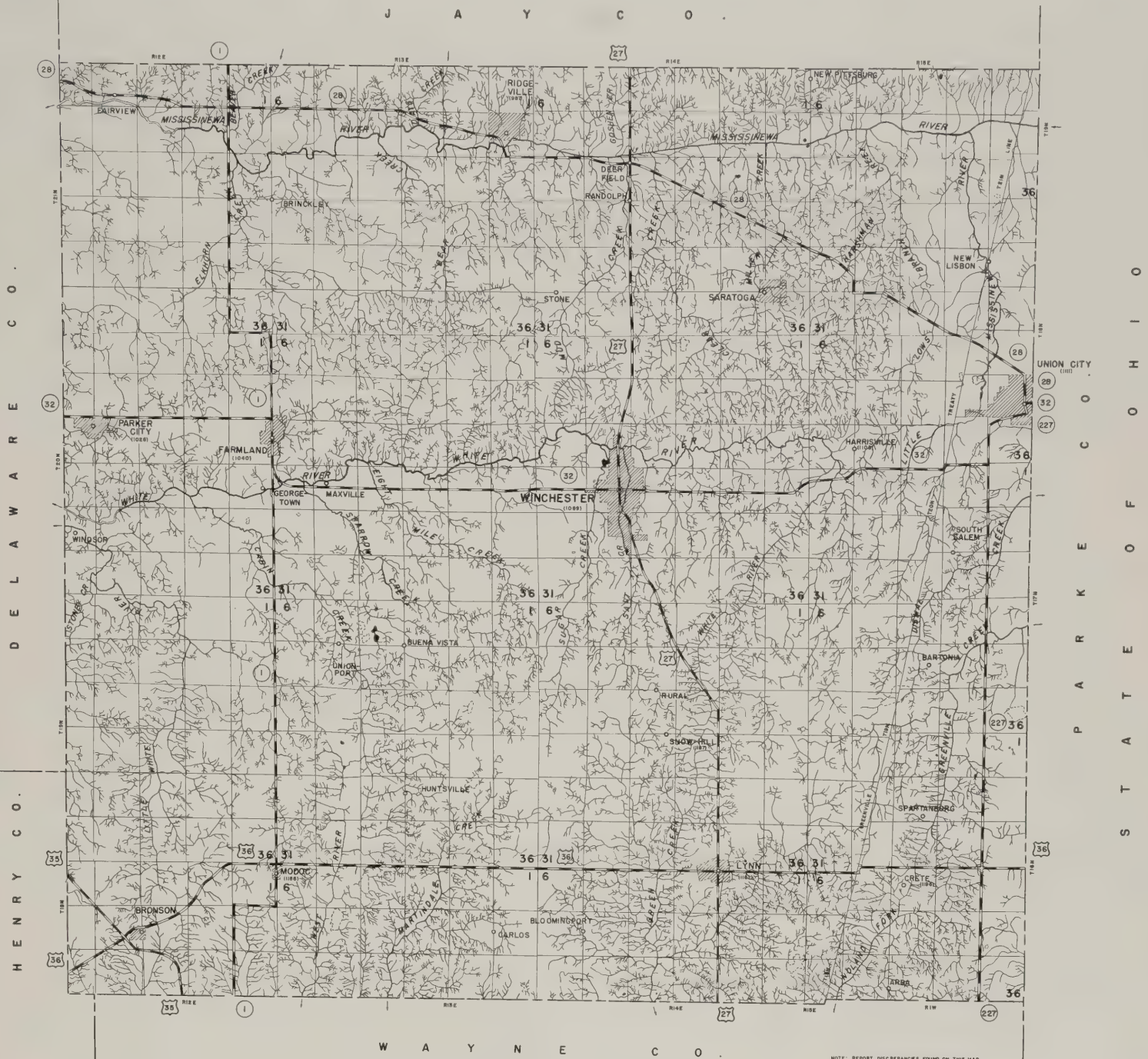
Two major east-west watersheds divide the county approximately into thirds. The Mississinewa River has a shallow valley in the county. Its course appears to be controlled by the Mississinewa moraine. The course of White River appears to be controlled by the Union City moraine, although this moraine is of only slight expression. White River, a few miles from its origin, is deflected from its northerly course to flow westerly along the south side of the Union City moraine. In the eastern part of the county the watershed slopes toward Stillwater River in Ohio. Stream courses appear to be controlled, at least partially, by the presence of the moraines. The increase in density of drainage patterns can be attributed in certain sections to morainic topography. In the southern part the watershed divide in the glacial material coincides more or less with the elevation of the bedrock. A singular feature of the drainage of the county is the northerly direction in which most of the long tributaries of the Mississinewa and White rivers flow. Southerly flowing tributaries are short. Northerly flowing tributaries are nearly parallel to each other; this indicates a nearly even slope to the terrain. Surface drainage is best developed along the valleys of the principal streams. The headwater tributaries of White River flow only slightly below the till plain surface. In many places it is difficult to distinguish the exact location of the divides between watersheds. Many of the state's principal rivers rise in the county. The headwater tributaries of the Whitewater system rise in the southern part. Nolands Fork rises near the high point in the state.

There are no natural lakes in the county. Ponds of various origins are scattered throughout the area.

Ditches have been constructed to improve sluggish drainage conditions in many parts of the county.

A stream gaging station is located on the Mississinewa River at Ridgeville (12). The Mississinewa River rises in Ohio; its drainage area in that state is small (3). The drainage area of the Mississinewa above Ridgeville is about 135 square miles (12).

Note: The drainage map was prepared from 1941 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1952.



DRAINAGE MAP RANDOLPH COUNTY INDIANA

PREPARED FROM
1941 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1952



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

RIPLEY COUNTY

GENERAL NATURE OF THE COUNTY

Ripley County is located in the southeastern part of the state. Its area is approximately 442 square miles (1). Versailles, the county seat, is 70 miles southeast of Indianapolis.

From data collected in surrounding counties, the mean annual precipitation should be about 42 inches (2). An average annual snowfall of about 25 inches can be expected.

The eastern half of Ripley County lies in the Dearborn Upland physiographic region of the state, and the western half is in the Muscatatuck Regional Slope (3). In respect to its physiographic situation in the United States, the county is in the Till Plains section of the Central Lowland province (3).

The surface of the county is that of a glacial plain broken by the valleys of the major streams and their tributaries. The Laughery escarpment is a prominent feature in the eastern part of the county. Maximum local relief is about 300 feet (3). In the western and northern parts, upland interstream areas are relatively flat. Sinkholes along many of the streams in the southern half of the county give a pitted appearance to the terrain immediately adjacent to the stream valleys. Irregularities in the terrain seem to be due to the bedrock.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock in the western half of the county consists of strata of Silurian age. In the eastern half they are of Ordovician age. Rock outcrops in nearly all parts of the county. Limestone has been quarried in many places. It is very close to the surface in some of the uneroded upland areas.

All Ripley County was glaciated (3). The drift is Illinoian in age (28). Much of it has been eroded from the slopes of the Laughery Creek valley. Streams are flowing on rock in many other parts of the county. Much of the drift is thin on limestone or shale near the streams; it appears to be thickest on the interstream divides.

The soils of the county have been derived from glacial and residual materials (5). There has been some reworking of the materials by water in the stream valleys. Underlying bedrock has had some influence on the development of the soils where the drift is thin. Illinoian drift soils belong to the Cincinnati and Grayford catenas. Limestone-shale soils are of the Switzerland catena. Alluvial soils belong to the Genesee catena. A few depressions contain soils of high organic content. Most subsoils of the county are slow to very slowly permeable (6).

Granular materials are limited mostly to stream deposits of local bedrock fragments. Materials of this sort have been obtained from the Laughery and Otter Creek valleys (7). A ridge near Penntown contains

stratified sand (28). Otherwise, sand deposits are confined to an occasional streak in the alluvium of the larger streams.

DRAINAGE FEATURES

Ripley County lies within three drainage basins of the state (3). The western part is in the Muscatatuck basin. Most of the remainder is in the Minor Ohio basin. The extreme northeast corner is in the Whitewater basin.

Laughery Creek is deeply entrenched in the county. Laughery Creek turns southeast from the escarpment in its course toward the Ohio River; it appears to be flowing in a preglacial channel. South Hogan Creek is deflected southeasterly. Vernon Fork Muscatatuck River is slightly entrenched in the northwestern part of the county. Low gradient streams extend for long distances into the gently sloping uplands. Noticeable is the curving course of Ripley Creek and the distorted courses of the headwater streams of Laughery Creek. There is some subterranean drainage. This occurs adjacent to the streams, mostly in the western part. The western side of Laughery Creek valley is steeply sloping, being very nearly vertical in places. Small waterfalls exist along portions of the valley wall. The watershed divide in the eastern part is a nearly level tract, it extends across the northeast corner, also. Surface drainage is best developed along the valleys of the principal streams. Drainage patterns in the uplands appear more or less uniform. Where streams are deeply incised in limestone the flood plains are narrow and valley walls steep. The southwesterly trend of the nearly parallel streams in the western half of the county indicate the control exerted on them by the westerly dipping bedrock strata comprising the regional slope down which they flow. Raccoon Creek dissects the face of the Laughery Creek along the western side of the valley; they originate near the crest of the escarpment. In the southern part the headwater streams of Indian-Kentuck Creek outline the crest of the escarpment. Natural drainage in interstream areas in some parts is impeded. Pipe Creek drains the northeast corner in a northerly direction. Only short streams enter Laughery Creek from the east in the central part of the county.

There are no natural lakes in Ripley County. Ponds of various origins are scattered over the area.

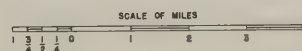
Ditches have been constructed to improve sluggish drainage conditions. Drainage in the interstream areas is quite often accomplished by shallow surface ditches;

Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1948.



DRAINAGE MAP RIPLEY COUNTY INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
STATE HIGHWAY COMMISSION OF INDIANA
AT
PURDUE UNIVERSITY
1948



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

RUSH COUNTY

GENERAL NATURE OF THE COUNTY

Rush County is located in the east-central part of the state. Its area is approximately 409 square miles (1). Rushville, the county seat, is 40 miles east-southeast of Indianapolis.

Mean annual precipitation is 40.77 inches at Mauzy (2). More than 25 inches of snow can be expected annually.

The southeast corner of the county is in the Dearborn Upland physiographic region of the state (3). The northwest portion is in the Tip-ton Till Plain. The remainder, or central part, is included in the Muscatatuck Regional Slope. In respect to its physiographic situation in the United States, the county is in the Till Plains section of the Central Lowland province (3).

The surface of the county is that of a gently undulating glaciated plain. It is broken by the valleys of the major streams and the relief is intensified by the presence of morainic ridges. Maximum local relief is about 75 feet (3). The southeastern part of the county is rolling (54). Till plain upland areas have gentle sags and swells. Morainic areas are somewhat rolling; ridges exist north of Rushville. A broad, undulating tract exists in the northwestern part.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock in the eastern and northern parts of the county consists of strata of Silurian age. In the remainder of the county they are of Devonian age. The deep mantle of drift prevents these rocks from having a pronounced effect on local topography. Limestone outcrops along Big Flat Rock and Little Flat Rock rivers.

All Rush County was glaciated (10). Surface drift in most of the county is Wisconsin in age. A very small area in the southeastern corner is covered with a mantle which has been identified as Illinoian drift (28). The depth of the drift varies to about 100 feet. Sections of three morainic systems are present. The Shelbyville moraine crosses the southeast corner. The Champaign moraine extends in a northeasterly direction diagonally across the county from the southwest corner. The Bloomington moraine is in the northwestern corner.

The soils of the county have been derived from glacial materials, some of which have been reworked by water (5)(54). Apparently the underlying rock has had little influence on the development of the soils except in limited areas. The soils north and west of Big Flat Rock River belong to the Russell catena. The terraces have Fox and Westland soils. Soils of the bottom lands are of the Genesee catena. Depressions contain soils high in organic content. Very little muck has been mapped in the county. Upland subsoils vary from moderately to slowly permeable (6). An area in the northeast corner has subsoils which are mostly permeable. River valley subsoils are permeable.

Granular materials occur along the major streams and in knolls and ridges. Deposits of gravel occur in stream terraces and valley walls (7). A granular outwash plain exists in the northern part of the county. Areas producing sands and gravels are mostly located in the north-eastern and northwestern parts, with scattered areas in the central part.

DRAINAGE FEATURES

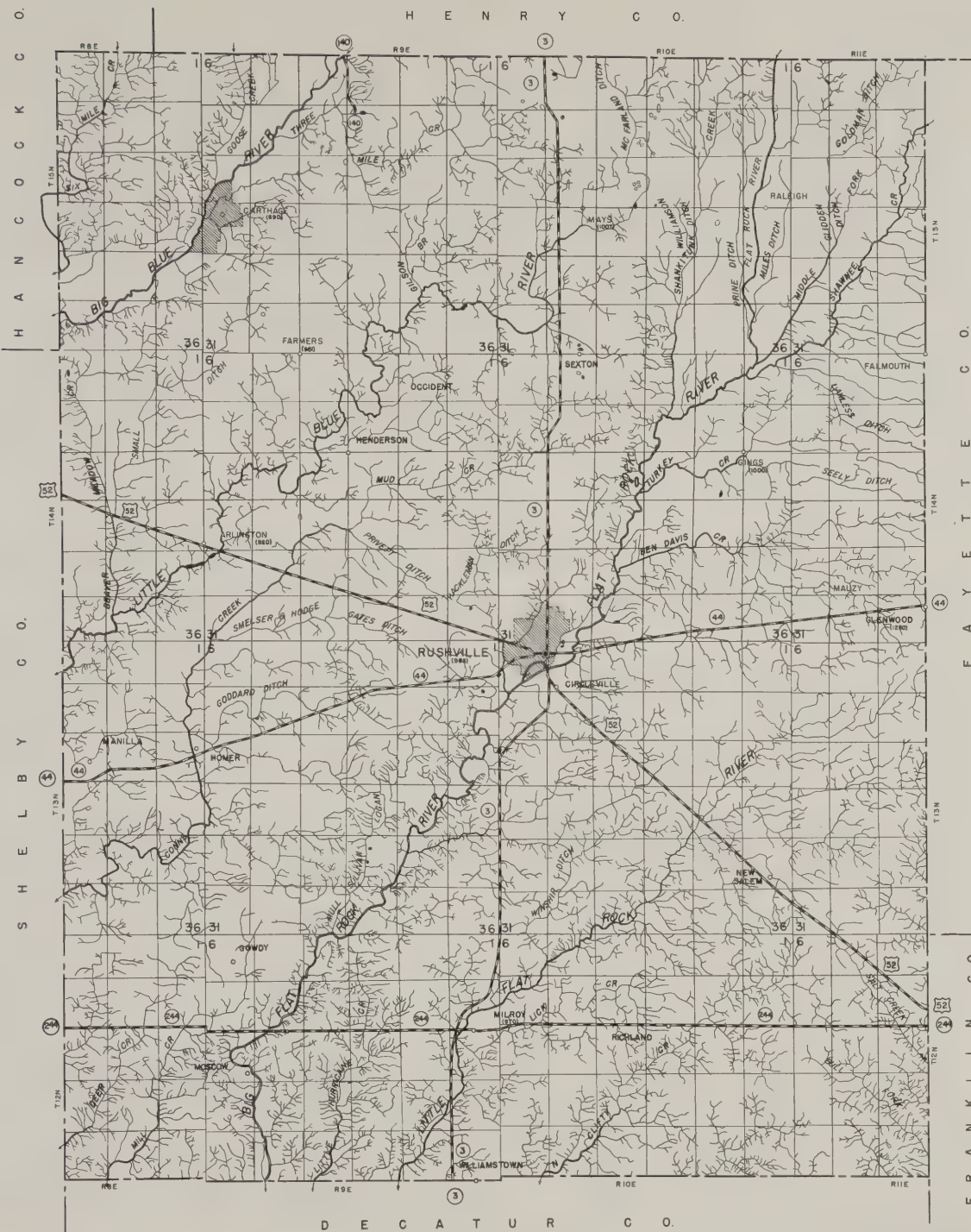
The southeastern corner of the county is in the Whitewater drainage basin of the state (3). The northwest corner of the county is in the White River basin proper and the remainder is in the East Fork subdivision of the White River drainage basin.

Blue River is rather deeply entrenched, but on the whole most stream valleys are shallow. There is an over-all parallelism in the courses of the principal streams. Stream courses in the central-eastern part show an unusually remarkable westerly trend for several miles; this indicates an even slope since they are also nearly parallel to each other. Drainage is better developed east of Big Flat Rock River than west of that stream. The land is well drained in the Whitewater River basin. Big Flat Rock River shows rock control by its meandering and entrenchment in the southwest corner of the county. The valleys of Flat Rock and Big Blue rivers acted as glacial sluiceways. The southwest trend of the streams in most of the county shows the control exerted on them by the regional slope. This is largely produced by the southwesterly dip of the bedrock. Surface drainage is best developed along the valleys of some of the principal streams. Shallow basins occur locally. Crests of sections of moraines define watershed divides in the county. Control of some of the stream courses and some stream deflections may be attributed, at least partially, to the presence of the moraines. Drainage pattern densities appear to conform to topography and surface materials; in the morainic areas they are rather fine-textured. A distinct watershed divide lies in the eastern part of the county. Little Blue River exhibits some unusually curving meanders as if rock controlled.

Rush County contains no natural lakes. A few water-filled gravel pits and ponds of various origins are scattered over the area.

Ditches have been constructed where necessary to improve drainage conditions.

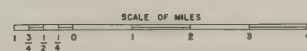
Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1947.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP RUSH COUNTY INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
STATE HIGHWAY COMMISSION OF INDIANA
AT
PURDUE UNIVERSITY
1947



ST. JOSEPH COUNTY

GENERAL NATURE OF THE COUNTY

St. Joseph County is located in the northern part of the state. Its area is approximately 467 square miles (1). South Bend, the county seat, is about 135 miles north of Indianapolis.

The mean annual precipitation is 34.89 inches at South Bend, and 33.15 inches at Notre Dame (2). An average annual snowfall of nearly 40 inches can be expected.

St. Joseph County lies within three section of the Northern Moraine and Lake physiographic region of the state (3). A small area in the extreme northwest corner is in the Valparaiso Moraine section, the south-central and southeastern parts are in the Steuben Morainial Lake section, and the remainder of the county is in the Kankakee Lacustrine section. In respect to its physiographic situation in the United States, the county is in the Eastern Lake section of the Central Lowland province (3).

The surface of the county varies from low, nearly level lacustrine plains to morainic ridges. It is that of a glaciated plain broken by the valleys of the St. Joseph and Kankakee rivers and their tributaries. Maximum local relief is about 100 feet (3). Moraines are undulating with numerous depressions. They are rather prominent land forms in various parts of the county. For some distance south of South Bend the morainic knolls are prominent. Till plain topography prevails in the southeastern part. Outwash plains are nearly level to gently undulating and are marked with numerous abandoned channels and infiltration basins. Outwash plains lie at different elevations. They contain numerous basins. Some steep-sided knolls are found in the north central part of the county.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock in the northeastern part of the county consists of strata of Mississippian age. In the southwestern part they are of Devonian age. There are no known rock outcrops.

The county is mantled with deep glacial drift. Surface drift materials are Wisconsin in age (10). The drift thickness varies to 300 feet. The Valparaiso moraine crosses the northwest corner of the county (10). There is little variation in the elevation of the crest of this moraine. The Kalamazoo moraine is present in two small masses along the center of the northern boundary of the county. The Maxinkuckee moraine extends southward from South Bend into Marshall County. The western side of the moraine is irregular. The eastern side is more rolling than the western side. The Bremen moraine extends southeastward from near Lakeville.

Soils have developed mostly from glacial materials, many of which have been reworked by wind and water (5). These include till, outwash, and alluvium (55). Upland soils belong to the Miami, Galena, and Hillsdale catenas. Soils of the terraces belong to the Fox and Warsaw catenas. Door and Tracy soils occur on the granular outwash plains. Coloma soils are granular. Areas mapped as depressions have soils high

in organic content. Many contain muck and/or peat. In general, the subsoils of the uplands are mostly permeable (6). Areas of sandy or gravelly materials have very permeable subsoils.

Granular materials occur in the outwash plains, terraces, knolls, and ridges (7). Plains of granular material border the St. Joseph River on the north and west. Subsurface deposits of granular materials exist. Areas producing sands and gravels are located in the northwestern third and in the central-eastern parts of the county. Scattered sand deposits are found in the upland and outwash areas. Dunes are prominent in places. Sand covers some areas in the till plains. Sands occur in the Kankakee valley; its valley floor is a lacustrine sand plain.

DRAINAGE FEATURES

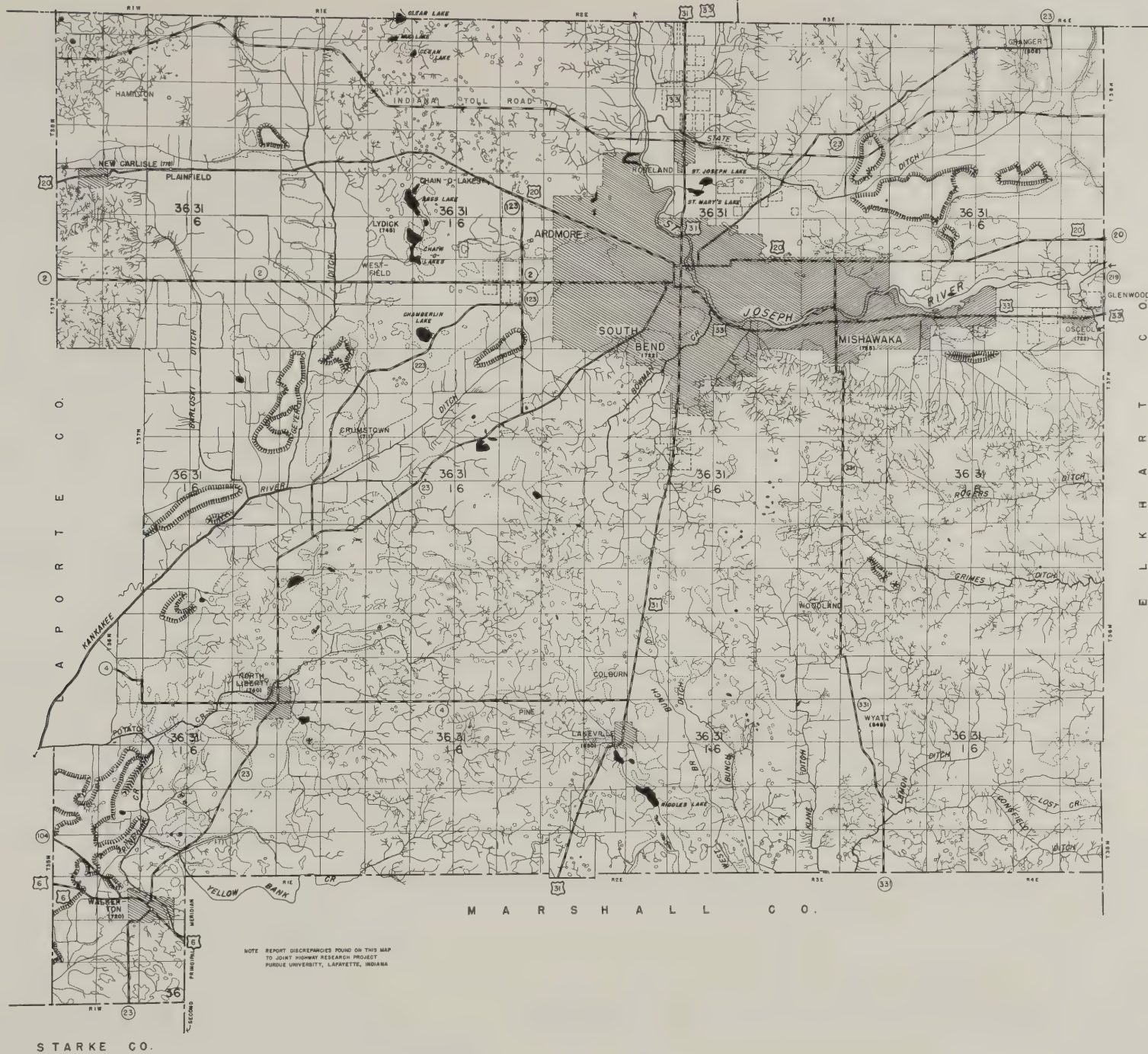
St. Joseph County lies within three drainage basins of the state (3). A small area in the northwest corner is in the Calumet drainage basin; the northeast quarter is in the St. Joseph drainage basin; and the remainder of the county is in the Kankakee drainage basin.

The most striking drainage feature is the St. Joseph River in its abrupt change from a westerly to a northerly flowing stream. Many features in its valley indicate aggradation, glacial and otherwise. Small streams enter the St. Joseph River in the county. The river valley is a line of glacial drainage. The crests of the sections of moraines in the county define watershed divides. Some of the courses of streams and some stream deflections can be attributed, at least partially, to the presence of the moraines. Increased densities of drainage patterns occur in the morainic areas; these patterns are haphazard. The Kankakee River follows a line of glacial drainage. Drainage in the central-eastern part is eastward into Elkhart County. Many local basins occur in nearly all parts of the county. Outwash areas have excellent internal drainage; therefore, streams have few tributaries dissecting the surface. Surface drainage of muck and peat areas is effected mostly by ditches. Headwater tributaries of Yellow River drain the southeastern part. Stream valleys are shallow in the outwash areas.

St. Joseph County contains several small lakes. Ponds of various origins are scattered throughout the area. Some lakes are connected by streams. Gaging stations are located on North Chain, Riddles, and South Chain lakes (12).

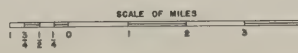
Ditches have been constructed to improve sluggish drainage conditions in the nearly level sections. Streams also have been dredged, the most notable example being the Kankakee River. Remnants of the old stream exist in the many oxbows near the present channel. The St. Joseph River has a drainage area of about 3,550 square miles above South Bend (3). A total of about 1,650 square miles is the area of the St. Joseph drainage basin in Indiana (12).

Note: The drainage map was prepared from 1938 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1947.



DRAINAGE MAP ST. JOSEPH COUNTY INDIANA

PREPARED FROM
1938 AAA AERIAL PHOTOGRAPHS
BY
STATE HIGHWAY COMMISSION OF INDIANA
AT
PURDUE UNIVERSITY
1947



POLYCONIC PROJECTION

SCOTT COUNTY

GENERAL NATURE OF THE COUNTY

Scott County is located in the southern part of the state. Its area is approximately 193 square miles (1). Scottsburg, the county seat, is about 75 miles south-southeast of Indianapolis.

Mean annual precipitation is 41.67 inches near Scottsburg (2). An average annual snowfall of about 20 inches can be expected.

Scott County lies within three physiographic regions of the state (3). Progressively from east to west, they are: Muscatatuck Regional Slope, Scottsburg Lowland, and Norman Upland. In respect to its physiographic situation in the United States, the Norman Upland portion of the county is in the Highland Rim Plateau section of the Interior Low Plateaus province, and the remainder of the county is in the Till Plains section of the Central Lowland province (3).

The topography of the county varies from hilly in the southwestern part to nearly level in the central part, to somewhat rolling in the eastern part. Maximum local relief is about 400 feet (3). The surface of the southwestern section of the county is rather highly dissected because of the presence of the Knobstone escarpment; this is perhaps the most prominent topographic feature of the county. There are some sinkholes in the extreme southwestern part. The central part of the county contains several areas of nearly level land, especially the broad alluvial lands bordering Stuckers Fork and the Muscatatuck River. The nearly level upland tracts west of Scottsburg and in the vicinity of Austin are crossed by small streams in shallow valleys. The central part of the county lies in the trough of the Scottsburg Lowland. The eastern part of the county, and in particular, the central-southern, is undulating due to stream dissection. There are some nearly level interstream areas in the southeastern part. Sharp-crested divides separate local watersheds in the Knobstone escarpment region; a few of the hills appear isolated although connected at their bases.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock in the western part of the county consists of strata of Mississippian age. In the eastern part they are of Devonian age. Rock outcrops in all but the southwestern third of the county; here are found exposures of the sandstone-shale combination. Limestone is quarried in the eastern part.

Most of Scott County was glaciated (8). The Illinoian glacier is thought to have extended at least to the foot of the Knobstone escarpment in the southwestern part of the county (28). The upland areas in the central and eastern parts are mantled with Illinoian drift. Part of the drift has been reworked by erosion. Much of the drift near the streams is thin on limestone or shale. The drift border is irregular since it follows the serrated face of the Knobstone escarpment. There are no noticeable morainic areas (8).

Soils of the county have been developed from residual, glacial, and water deposited materials (6). Soils of the sandstone-shale areas belong to the Cincinnati and Jennings catenas. Soils of the Grayford catena also exist. Some stream valley soils belong to the Elkinsville catena. Alluvial soils are of the Pope catena. Some depressions have

soils of high organic content. In the western part subsoils are moderately to slowly permeable (6). In the eastern part they vary from slowly to very slowly permeable. River valley subsoils are mostly permeable.

Stream deposits of local bedrock fragments occur in the southwest part of the county (7). Otherwise, granular materials are scarce. Lacustrine soils occur along Stuckers Fork and East Fork Muscatatuck River. These streams are alluviated.

DRAINAGE FEATURES

Most of Scott County lies within the Muscatatuck subdivision of the White River drainage basin of the state, the exception being that small areas in the southwestern, south-central, and southeastern parts are in the Minor Ohio drainage basin (3).

The East Fork Muscatatuck River forms the northern boundary of the county. Natural drainage systems are best developed in the southwestern part of the county. Drainage patterns are noticeably different in the eastern, central, and southwestern parts.

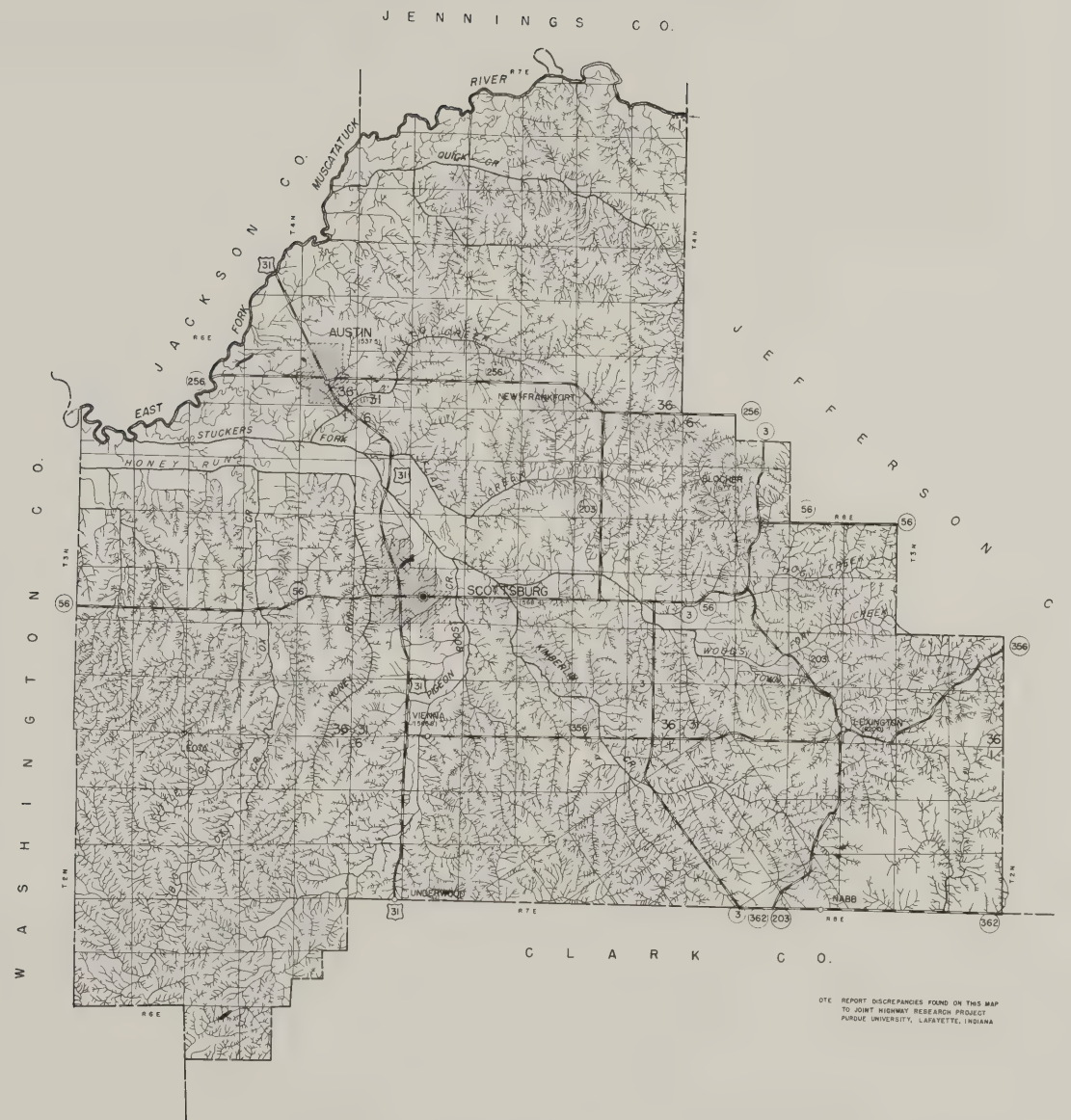
A cut-off in the East Fork Muscatatuck River has isolated a tract of land along the Jennings-Scott county line. The direction of flow of the streams in the eastern part is influenced, at least partially, by the dip of the underlying bedrock. A few stream courses in the extreme southeastern part conform to the direction of the regional slope. Streams coursing down the face of the Knobstone escarpment have high gradients. When the streams reach the lowland their gradients become low. Many streams flow on rock in portions of their courses. Many small intermittent streams meander in the alluviated area along Stuckers Fork. In the Illinoian drift uplands low-gradient, shallow tributaries extend for long distances into the uplands. North-flowing streams in the west-central part are fairly straight and nearly parallel to each other. The centripetal pattern of the Stuckers Fork stream system is conspicuous. Some barbed drainage patterns are evident in the southwest corner where stream piracy has occurred. Natural drainage in the interstream areas of the southeastern and northeastern parts in some cases impeded.

There are no natural lakes in the county. Ponds of various origins exist in many sections.

Ditches have been dredged to improve drainage in the low-lying areas. Streams have been straightened, widened, and deepened in some cases. Drainage in the nearly level Illinoian drift areas is often effected by shallow surface ditches.

A stream gaging station is located on East Fork Muscatatuck River near Austin (12). The drainage area of East Fork Muscatatuck River above Austin is about 370 square miles (12).

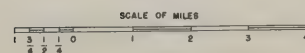
Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1949.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP SCOTT COUNTY INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
STATE HIGHWAY COMMISSION OF INDIANA
AT
PURDUE UNIVERSITY
1949



POLYCONIC PROJECTION

SHELBY COUNTY

GENERAL NATURE OF THE COUNTY

Shelby County is located in the south-central part of the state. Its area is approximately 409 square miles (1). Shelbyville, the county seat, is 25 miles southeast of Indianapolis.

Mean annual precipitation is 40.59 inches at Shelbyville (2). An average annual snowfall of about 25 inches can be expected.

The northwestern third of Shelby County lies within the Tipton Till Plain physiographic region of the state (3). A small area in the southwest corner is in the Scottsburg Lowland, and the remainder of the county is in the Muscatatuck Regional Slope. In respect to its physiographic situation in the United States, the county is in the Till Plains section of the Central Lowland province (3).

The surface of the county is that of a glacial plain broken by the valleys of the principal streams. Much of the county is nearly level to gently rolling. There are some high morainic hills in the southwest corner. The Mt. Auburn ridge is very conspicuous; it is a portion of a morainic system. Maximum local relief is about 75 feet (3). Morainic topography is choppy (hob-nailed) in the northern part. The broad glacial sluiceways extending southward across the county are nearly flat locally; they are shallow depressions. Dissection is greatest near such streams as Flat Rock River. The area adjacent the river is rolling. Interstream areas are nearly level to gently rolling.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock consists of strata of Devonian age. These rocks are limestones and shales. They are exposed along the major streams in the southeastern part of the county and in the bed of Blue River at Shelbyville.

All Shelby County was glaciated (3). Surface drift is Wisconsin in age. The drift varies in depth to 150 feet. The county is crossed by sections of two morainic systems (10). The Champaign moraine passes across the central and southern parts of the county. The Bloomington moraine traverses the northern part. Features of the Champaign moraine are very prominent in the southwestern corner of the county; Mt. Auburn is the highest part.

Soils of the county have developed from glacial materials (5). Little influence on them is effected by the bedrock. Some of the materials have been reworked by water. Upland soils belong to the Miami and Russell catenas. Fox, Homer, and Westland soils occur on the granular deposits. Alluvial soils are of the Genesee catena. Some depressions contain soils high in organic content. Most upland subsoils vary from moderately to slowly permeable (6). River valley subsoils are very permeable. The texture of the surface soil varies, being mostly silty.

Granular materials have been found in nearly all parts of the county (7). They occur along the streams and in knolls and ridges. Morainic hills in the southwestern part contain granular materials. Areas producing sands and gravels are located in the central and central-northern parts of the county. Gravel has been found along Blue River, Sugar Creek, Flat Rock River, and Brandywine Creek. Gravel occurs in the glacial sluiceways. A few knolls and ridges in which sand predominates are found in various parts of the county.

DRAINAGE FEATURES

Shelby County lies wholly within the East Fork subdivision of the White River drainage basin of the state (3).

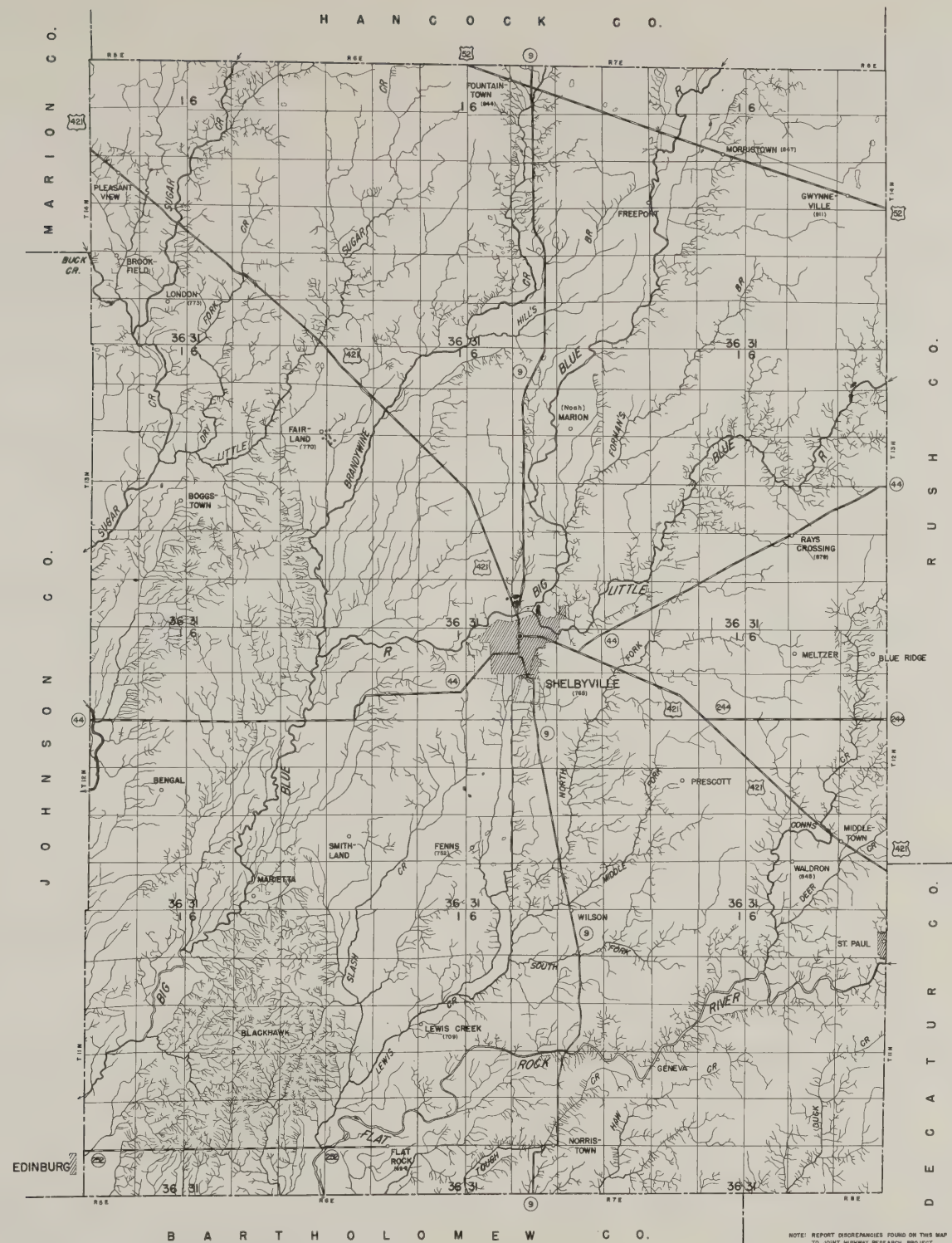
The streams of the eastern and central parts of the county tend to follow the regional slope; the trend of drainage is to the southwest. There is an over-all parallelism to the principal streams. Natural drainage is well developed in the southwest corner of the county. Some streams in the southern part flow in rock in portions of their courses. Little Blue River, Flat Rock River, and Conns Creek show deflections which may be attributed to rock control. The Blue River valley is quite wide but comparatively shallow. Glacial melt-water drainage channels extend from north to south through the county. Streams are rather insignificant in these channels in most cases. Current markings are noticeable in some portions of these channels. Most of the major streams flow in glacial sluiceways. Crests of moraines define watershed divides in the county. Some stream courses and some stream deflections are controlled, at least partially, by the presence of the moraines. Drainage patterns are fine-textured in the southwestern part.

There are no natural lakes in Shelby County. Ponds of various origins are scattered throughout the area.

Ditches have been constructed where necessary to improve sluggish drainage conditions.

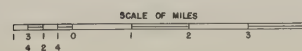
A stream gaging station is located on Big Blue River at Shelbyville (12). The drainage area of Big Blue River above Shelbyville is about 408 square miles (12).

Note: The drainage map was prepared from 1941 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1948.



DRAINAGE MAP SHELBY COUNTY INDIANA

PREPARED FROM
1941 AAA AERIAL PHOTOGRAPHS
BY
STATE HIGHWAY COMMISSION OF INDIANA
AT
PURDUE UNIVERSITY
1948



POLYGONIC PROJECTION

NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

SPENCER COUNTY

GENERAL NATURE OF THE COUNTY

Spencer County is located in the southwestern part of the state. Its area is approximately 396 square miles (1). Rockport, the county seat, is about 135 miles southwest of Indianapolis.

From data obtained in adjacent counties, the mean annual precipitation should be about 42 inches (2). An average annual snowfall of about 15 inches can be expected.

Most of Spencer County lies within the Wabash Lowland physiographic region of the state (3). Only a small area in the northeastern corner has been included in the Crawford Upland. In respect to its physiographic situation in the United States, the county is in the Interior Low Plateaus province (3).

The surface of Spencer County varies from nearly level lowlands to very rolling uplands. Maximum local relief is about 220 feet (3). Several high hills occur northwest of Rockport. The eastern part of the county has rather great differences in elevation; it has high hills and sharp ridges and narrow intervening valleys. Lacustrine areas in the southwestern part are nearly level. The terrain is hilly near Chrisney and Rockport. An island-like portion of upland occurs between Rockport and Enterprise.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock consists of strata of Pennsylvanian age. These formations are shales, sandstones, limestones, and coals. These rocks outcrop at various places in the county. Limestone outcrops along the Sandy and Little Pigeon creeks. Sandstone outcrops along Dead Fall Creek and the Ohio and Anderson rivers. Coal outcrops in the southwestern part of the county.

Spencer County lies outside the glaciated area of the state (9). Some effects of glaciation are the Ohio River terrace deposits and the lakebeds along the larger streams.

The soils of the county have been derived from residual, aeolian, and water-deposited materials (5). Sandstone-shale soils belong to the Zanesville catena. Loessial soils belong to the Hosmer and Alford catenas. Alluvial soils belong to the Huntington and Pope catenas. Some depressions contain soils of high organic content. Upland subsoils vary from moderately to slowly permeable. Lakebed subsoils are slowly permeable (6). Loessial area subsoils are mostly permeable. Some river valley subsoils are permeable.

There are bars of gravel and fine sand in the Ohio River (7). Some stream deposits of local bedrock fragments occur.

The uplands in the western half of the county have been mapped as being covered with deep loess (20). Lacustrine deposits occur along streams entering the Ohio River (9). Extensive alluvial lands are to be found in the county. Buried silts are found exposed in the Ohio River valley wall southwest of Rockport.

DRAINAGE FEATURES

Most of Spencer County lies within the Minor Ohio drainage basin of the state (3). Only a small area in the north central part is in the Patoka drainage basin.

Natural drainage is best developed in the upland areas. Drainage is integrated in many parts of the upland. Natural drainage in the lowlands has had to be supplemented artificially. Streams entering the Ohio River have exceptionally wide valleys; they appear to be aggraded due to the effects of glaciation. The bedrock upland extends to the Ohio River south of Rockport. There appears to be little change in the courses of some streams since glacial time (25). The courses of natural drainage have been disrupted by strip mining operations in many parts of the county. An alluviated channel extends northwest from near Rockport to the Little Pigeon Creek valley. Many streams flow in rock in portions of their courses. Streams in the eastern part meander through rocky valleys. In the north-south portions of their courses, Little Pigeon Creek, Crooked Creek, and Anderson River appear to be strike streams. Anderson River forms much of the eastern boundary of the county and Little Pigeon Creek forms much of the western boundary. Many streams have their sources near the watershed divide that traverses the center of the county in a southwest-northeast direction. Streams formed in the northern part flow in nearly all directions. Streams, such as Garrett and Coney Creeks, nearly parallel the curve of the Ohio River. Erosion is much in evidence in some areas.

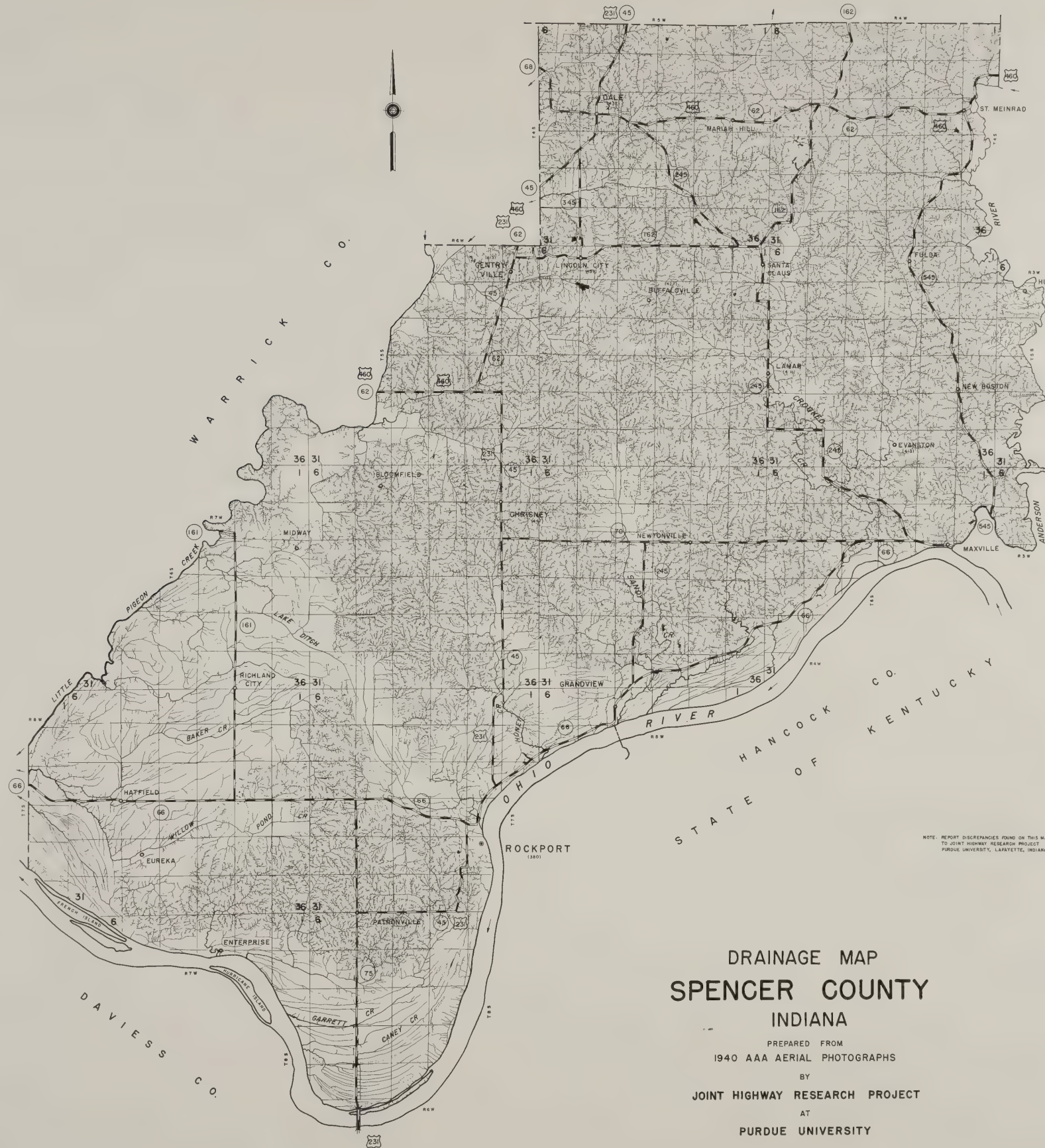
There are no natural lakes in the county. Ponds of various origins are scattered over the area. Bottom lands contain abandoned stream channels and bayous.

Ditches have been constructed where necessary to improve sluggish drainage conditions. Stream channels have been widened, straightened, and deepened in some cases. Lake Ditch is a typical example.

Stream gaging stations are located on the Ohio River at Rockport (12).

Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1951.

DUBOIS CO.



PERRY CO.

DRAINAGE MAP
SPENCER COUNTY
INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1951

SCALE OF MILES
1 2 3 4

NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

POLYCONIC PROJECTION

STARKE COUNTY

GENERAL NATURE OF THE COUNTY

Starke County is located in the northern part of the state. Its area is approximately 311 square miles (1). Knox, the county seat, is 110 miles north-northwest of Indianapolis.

Mean annual precipitation is 38.22 inches at Knox (2). An average annual snowfall of about 35 inches can be expected.

All Starke County is included in the Kankakee Lacustrine section of the Northern Moraine and Lake physiographic region of the state (3). In respect to its physiographic situation in the United States, it is in the Eastern Lake section of the Central Lowland province (3).

The surface of the county is that of a glacial plain much modified by wind and water action. Some morainic ridging is evident. Maximum local relief is about 60 feet (3). There is a broad, low ridge between North Judson and Bass Lake. Another broad, low ridge is between San Pierre and North Judson. There is a continuous rolling area in the vicinity of Koontz Lake. There are a few rather prominent knolls in the southeastern part of the county. Sand dunes and sand ridges are superimposed on the nearly level plain.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock consists of strata of Devonian age. There are no known outcrops of rock in the county.

All Starke County was glaciated. The surface drift is Wisconsin in age (4). The depth of the drift varies to more than 200 feet. A portion of the Maxinkuckee moraine extends into the southeastern corner (10). There may be a connection with this moraine through the low ridges of the county with the Marsailles moraine from the southwest in Jasper County.

The soils of the county have been derived from glacial materials (5). Many of these materials have been reworked by wind and water. Upland soils belong to the Miami and Metea catenas. Sand areas have Plainfield, Griffin, Berrien, Maumee, Demotte, and Newton soils. Some Fox soils occur on the granular deposits. Alluvial soils belong to the Genesee catena. Organic soils are mucks and peat. They occur in depressed areas. Most of the county has very permeable subsoils due to their sandy nature (6). Small areas in the southeastern part have permeable subsoils.

Some gravel has been found in the vicinities of Knox and North Judson (7). Ridged sand areas occupy parts of the county. Dune areas occur in places. The Kankakee basin is mostly a lacustrine sand plain (9).

DRAINAGE FEATURES

Most of Starke County is in the Kankakee drainage basin of the state (3). Only small areas in the southeastern and central-southern parts are in the Tippecanoe subdivision of the Wabash basin.

The Kankakee River was formerly a very meandering stream and remnants of the old stream exist in the many oxbows near the present channel. The Kankakee and Tippecanoe rivers have low gradients. Other streams have low gradients, also. Local basins occur in all parts of the county. Crests of sections of moraines in the county define local watershed divides. Small streams drain the morainic areas. Drainage patterns are haphazard and conform to the topography and surface materials. The Tippecanoe River flows through the moraine. Its deflected course is noticeable; this may have been the result of a barrier produced by effects of glaciation. Smith Ditch has an exceptional curving course. The trend of drainage is generally westerly toward the Kankakee River. The land immediately adjacent to the Kankakee River is swampy.

Starke County contains a few natural lakes. Ponds of various origins are found in many sections, also. Bayous remain for the dredging of the Kankakee River. Remnants of the old channel of Yellow River are now meander scrolls in its lower valley. Bass Lake has no natural inlet or outlet. There are ditches draining into it from the east, and at the southwest corner and an outlet ditch is its overflow channel to the Kankakee River. The main source of water for this lake is from springs and flowing wells. Gaging stations are located on Bass, Eagle, Koontz and Spitz lakes (12).

The county has many dredged ditches. Natural streams, also, have been dredged, examples being Yellow River, Eagle Creek, and Boyus River. Surface drainage of muck and peat areas is effected by ditching. Former lakes have been obliterated by dredging.

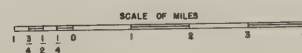
A stream gaging station is located on the Yellow River at Knox and on the Tippecanoe River near Ora (12). The drainage area of the Tippecanoe River above Ora is about 840 square miles (12).

Note: The drainage map was prepared from 1939 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1948.



DRAINAGE MAP STARKE COUNTY - INDIANA

PREPARED FROM
1938-39 AAA AERIAL PHOTOGRAPHS
BY
STATE HIGHWAY COMMISSION OF INDIANA
AT
PURDUE UNIVERSITY
1947



POLYCONIC PROJECTION

STEBEN COUNTY

GENERAL NATURE OF THE COUNTY

Steuben County is located in the northeastern corner of the state. Its area is approximately 310 square miles (1). Angola, the county seat, is 145 miles northeast of Indianapolis.

Mean annual precipitation is 36.59 inches at Angola (2). More than 40 inches of snow can be expected annually.

Steuben County lies wholly within the Steuben Morainial Lake section of the Northern Moraine and Lake physiographic region of the state (3). In respect to its physiographic situation in the United States, the county is in the Eastern Lake section of the Central Lowland province (3).

The surface of Steuben County is a partly hilly and a partly nearly level glaciated plain. Much of the area is occupied by moraines. The hills are at different levels, especially in the western part. Maximum local relief is about 230 feet (3). Morainic topography predominates and is prominent in many sections, much of it is knob-and-basin type. North of Angola the moraine consists of a group of dome-shaped or conical hills with basins of corresponding shape. Many of the basins are occupied by lakes. There are two nearly level tracts in the county, one in the southeast and one in the northwest part. The most uneven terrain lies east of Lake James. Morainic topography is well-developed in the southeastern part, also. An outwash plain occurs near Orland. In many places hills are rounded and valleys irregular; the drift has the appearance of having been piled in great mounds. Slopes are fairly steep in most morainic areas. Steep slopes are marked by rapid runoff. Slightly rolling tracts border the headwater streams of Pigeon Creek. Very rolling terrain borders Lake Hamilton. Intermorainic topography approaches that of the till plains.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock consists of strata of Mississippian age. There are no known outcrops of bedrock in the county.

All Steuben County was glaciated (3). Surface drift is Wisconsin in age. The drift thickness varies to more than 300 feet. The county is crossed by portions of four morainic systems (10). The Sturgis moraine is found in the northwest corner. The Wabash moraine covers the southeast corner. The combined Mississinewa and Salamonie moraines cover intermittent areas in the remainder of the county; it is difficult to determine the common borders in their overlapping sections.

The soils of the county have developed from glacial materials many of which have been reworked by wind and water (5)(56). Dominant soils belong to the Miami and St. Clair catenas. Sand areas have Plainfield soils. Fox and Warsaw soils are found on the granular deposits. Griffin soils are alluvial. Depressions contain Clyde soils. Muck and peat deposits are numerous. Areas of very permeable subsoils occur in the northwest corner of the county (6). Subsoils of slow permeability are found in the eastern parts. Areas of moderately permeable subsoils are scattered elsewhere.

Morainic hills of granular materials are interspersed with till knolls (7). Gravel seems to be plentiful in most of the county, especially in the central and western parts. Plains of granular materials occur in the western and northwestern parts. Areas producing sand and gravel are located in the central and southwestern parts. Some sand and gravel occur along Pigeon Creek. Sand dunes are found on some of the outwash plains. Many of the lake beaches are sandy. In the northwestern part there is a sandy tract with uneven surface. Marl deposits are found along the Pigeon Creek chain of lakes.

DRAINAGE FEATURES

The eastern and southeastern parts of Steuben County are a portion of the Maumee drainage basin of the state (3). The remainder of the county is included in the St. Joseph drainage basin.

The central-eastern and northeastern parts of the county drain into Ohio. Turkey Creek, Pigeon Creek, Crooked Creek, and the headwater streams of Fish Creek cross moraines. These streams have their sources on land which is lower than the moraine crests. Noticeable is the circuitous course of Pigeon Creek. Turkey, Pigeon, and Crooked creeks each occupy glacial channels. These streams connect chains of lakes. North of Angola is a channel of glacial drainage extending westward. Stream valleys are comparatively shallow. Fish Creek has a rather narrow valley. Local watershed divides are defined by the crests of sections of moraines in the county. Stream courses, stream deflections, and increased densities in drainage patterns can be attributed, at least partially, to the presence of these moraines. Local basins occur in all parts of the county.

There are several lakes in the county. With the exception of the central-eastern part they are fairly well distributed over the area. Ponds of various origins are scattered widely. The lakes have a great variety in size, depth, and outline of shore. Many streams wander from lake to lake. The lakes act more or less to stabilize the flow of their outlet streams.

Gaging stations are located on Bower, Crooked, Fox, Hamilton, Hogback, Jimerson, Gage, George, Little Otter, Long, Pleasant, Round, Clear, and Silver lakes (12).

Ditches have been constructed to improve drainage conditions. Basins have been drained. Streams have been dredged and lake levels, in some cases, lowered. Surface drainage of muck and peat areas is effected by ditching.

A stream gaging station is located on Pigeon Creek near Angola (12). The drainage area of Fawn River above Orland is about 88 square miles (12).

Note: The drainage map was prepared from 1938-1939 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1953.

This is a detailed topographic map of the Lake George National Forest area in New York. The map shows a dense network of lakes, including Lake George, Lake Champlain, and many smaller bodies of water like Lake Placid and Lake Minerva. Towns and settlements are marked with dots and labels, such as Plattsburgh, Ticonderoga, and Lake George. A grid system is overlaid on the map, with letters A through O along the top and bottom edges, and numbers 1 through 31 along the left and right edges. The map also shows roads, trails, and various geographical features like mountains and valleys. The title 'LAKE GEORGE NATIONAL FOREST' is prominently displayed in the center.

WILLIAMSON, C. O.

STATE OF THE UNION

NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

PREPARED FROM
1938 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1953

1938 AAA AERIAL PHOTOGRAPHS

BY

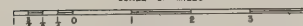
JOINT HIGHWAY RESEARCH PROJECT

AT

PURDUE UNIVERSITY

1953

SCALE OF MILES



POLYCONIC PROJECTION

DRAWN BY: R. L. DUNHAM

SULLIVAN COUNTY

GENERAL NATURE OF THE COUNTY

Sullivan County is in the southwestern part of the state. Its area is approximately 457 square miles (1). Sullivan, the county seat, is 85 miles southwest of Indianapolis.

Mean annual precipitation is 37.05 inches at Farmersburg (2). An average annual snowfall of less than 20 inches can be expected.

Sullivan County lies wholly within the Wabash Lowland physiographic region of the state (3). In respect to its physiographic situation in the United States, it is a part of the Till Plains section of the Central Lowland province (3).

The surface of the county is that of a glacial plain broken by the valleys of the Wabash River, and its tributaries. At Merom there is a high bluff fronting the Wabash River. Maximum local relief is about 170 feet (3). Dissection is greatest along the streams. As a whole the county is relatively flat. There are nearly level interstream tracts in the central and northern parts of the county; these divides are rather low. The sand areas are undulating. Some dissected areas lie in the northeastern and eastern parts.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock consists of strata of Pennsylvanian age. Sandstone outcrops at the Narrows (River-view), at Merom, and at several other places in the county. Coal outcrops in the eastern part of the county.

All Sullivan County was glaciated (3)(9). Surface drift is Illinoian in age. Its thickness varies according to the preglacial topography. In some places it is very thin. In other places it is masked by aeolian deposits. Terraces of Wisconsin age occur in the Wabash Valley.

The soils of the county have been developed from glacial, residual, aeolian, and water-deposited materials (5). Illinoian drift soils belong to the Cincinnati catena. Loessial soils belong to the Alford catena. Alluvial soils belong to the Genesee and Pope catenas. In the eastern part of the county the subsoils are slowly to very slowly permeable (6). River valley subsoils in the western part are mostly permeable. Subsoils in the central part are moderately to slowly permeable.

Granular materials are found in the terraces of the Wabash Valley (7). Areas producing sands and gravels are located along the western side of the county. Sand dunes occur in the uplands east of the Wabash

River. These are noticeable north and east of Merom. Deep loess has been mapped as covering a large portion of the southwestern, central-western, and northern parts of the county (20). Lacustrine plains occur along Turmans and Busseron creeks.

DRAINAGE FEATURES

A small portion of the northeast corner and a slightly larger area in the southeast corner of the county is in the White River drainage basin of the state (3). The remainder of the county is in the Wabash River drainage basin.

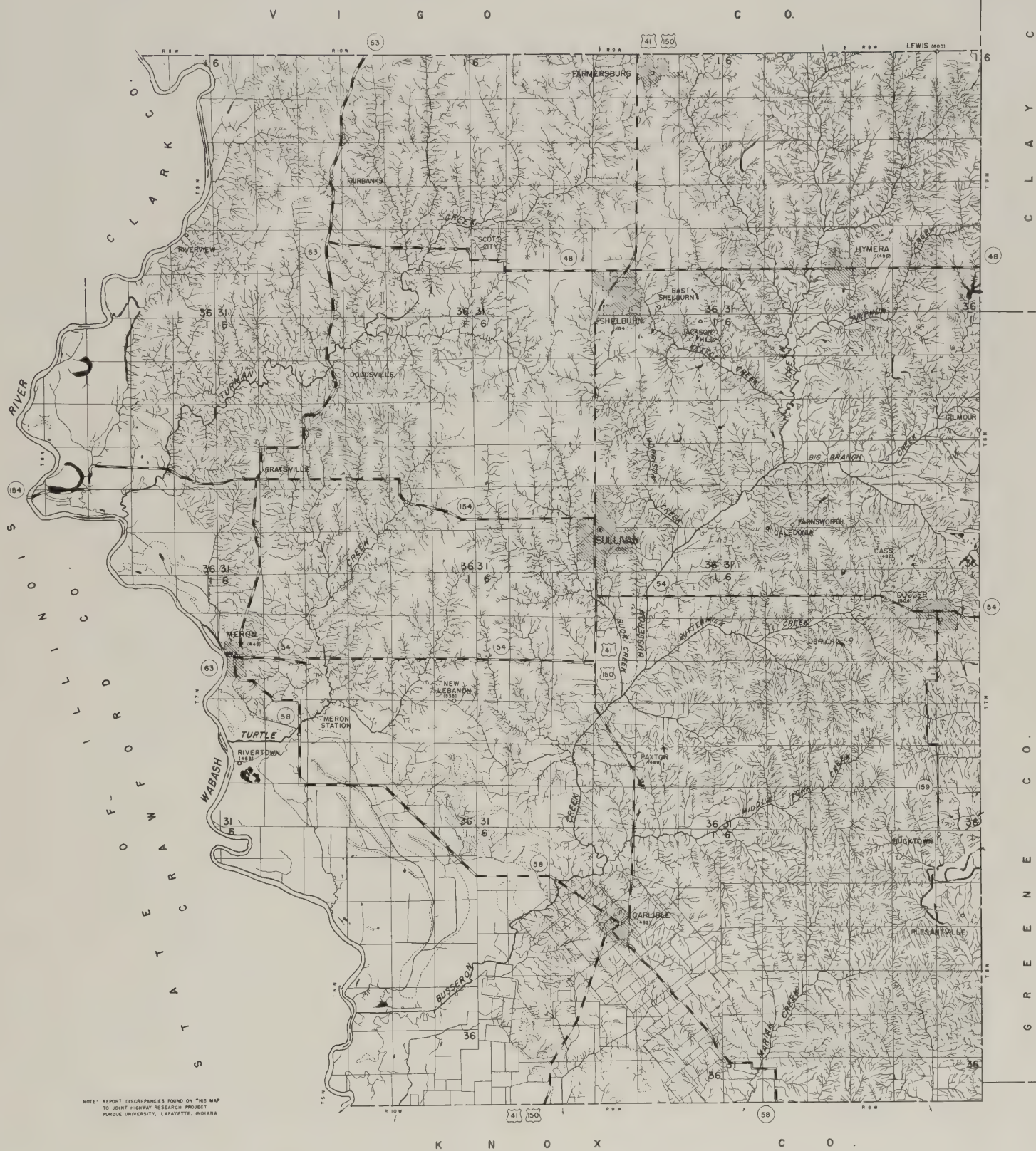
The Wabash Valley acted as a glacial sluiceway. The river flows in a preglacial valley. Natural drainage is perhaps best developed in the uplands adjacent the principal streams. Many stream valleys are wide. A watershed divide extends across the southeast corner. The Wabash River flows against the valley wall at the Narrows and at Merom. Busseron Creek apparently occupies a preglacial channel in its lower reaches. It is deflected in the central part. Drainage patterns are fine-textured in the dissected uplands. Low gradient gullies extend long distances into the uplands in the central part. A cut-off in the Wabash River has isolated a portion of Illinois into an island-like tract. Prairie Creek is deflected. Somtributaries of Turmans Creek exhibit curving courses.

Although there are no natural lakes in Sullivan County, there are several bayous resulting from abandoned meanders in the Wabash Valley. Water-filled strip mines and gravel pits, as well as ponds of various origins are scattered over the area. The courses of the natural drainages have been disrupted by strip mining operations, particularly in the eastern part of the county.

Ditches have been constructed to improve sluggish drainage conditions in low-lying and nearly level sections. An example is the dredging of the lower reaches of Busseron Creek; this stream now flows through an artificial channel to the Wabash River.

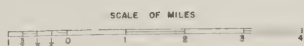
Stream gaging stations are located on the Wabash River at Riverton and on Busseron Creek near Carlisle (12). The drainage area of the Wabash River above Riverton is about 13,370 square miles (11), and the drainage area of Busseron Creek above Carlisle is 227 square miles (12).

Note: The drainage map was prepared from 1937 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1952.



DRAINAGE MAP SULLIVAN COUNTY INDIANA

PREPARED FROM
1937 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1952



POLYCONIC PROJECTION

SWITZERLAND COUNTY

GENERAL NATURE OF THE COUNTY

Switzerland County is in the southeast corner of the state. Its area is approximately 221 square miles (1). Vevay, the county seat, is 90 miles southeast of Indianapolis.

Mean annual precipitation is 43.77 inches at Markland (2). An average annual snowfall of about 25 inches can be expected.

Switzerland County lies wholly within the Dearborn Upland physiographic region of the state (3). In respect to its physiographic situation in the United States, it is in the Till Plains section of the Central Lowland province (3).

The surface of the county is that of a glacial plain much dissected by its principal streams. Maximum local relief is about 405 feet (3). The highest point is in the northwest part of the county. Near the Ohio River the ridges are long and even-topped. They appear to be at the same elevation. Occasional sinkholes can be found in local areas. Streams entering the Ohio River have trenched the upland plain deeply. Most stream valleys are rather narrow where their gradients are high.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock in most of the county consists of strata of Ordovician age. There is a small area in the northwestern part of the county where the uppermost strata belong to the Silurian age; limestone is quarried in this area.

All Switzerland County was glaciated (3). The drift is of Illinoian age (28). Much of it has apparently been eroded for drift remains only on the upland areas and ridge tops. An exception is that Illinoian drift hills are found in the Ohio Valley near Patriot. It is thin on the ridge tops near the river, but thicker in the central-northern part of the county. Terraces of both Illinoian and Wisconsin ages exist in the Ohio Valley.

The soils of the county have been derived from glacial and residual materials, some of which have been reworked by wind and water (5) (50). Soils developed on the granular terraces belong to the Wheeling catena. Upland Illinoian drift areas have soils belonging to the Cincinnati catena. Terrace soils are of the Wheeling catena. Soils of the limestone-shale areas belong to the Switzerland catena. Alluvial soils are of the Huntington catena. Few areas contain soils of high organic content. Nearly level upland areas and most sloping areas have slowly permeable subsoils (6). River valley subsoils are mostly permeable.

Areas producing sand and gravel are located along the Ohio River (7). Granular terraces are located at Florence, Vevay, and Lamb. Deposits of fragments of bedrock are found along the small streams of the county. Some local sand dunes occur in the Ohio Valley.

DRAINAGE FEATURES

Switzerland County lies wholly within the Minor Ohio drainage basin of the state (3).

The Ohio River is the base toward which the streams are cutting. It is deeply entrenched. Principal tributaries are entrenched near the river. Local subterranean drainage is confined to upland slopes adjacent to the drainageways. Noticeable is the deflected course of Log Lick Creek, apparently due to a granular terrace. Many streams flow over rock in portions of their courses. Some streams show minor deflections in their courses due to the water flowing over alternating beds of resistant and non-resistant rocks. Valleys of streams entering the Ohio River are alluviated near the river. Streams in the limestone-shale areas exhibit a smoothly curving subdendritic drainage pattern. These patterns are fine-textured. Grant Creek flows in an easterly direction. In the north-central part, natural drainage is in some cases impeded. A watershed divide extends in an east-west direction across the northern part of the county. Another divide extends in a north-south direction near the western side of the county. Streams in the northern part flow in a northerly and easterly direction. The Ohio River flows close to the valley wall in a number of places.

There are no natural lakes in the county. Artificial lakes and ponds of various origins are scattered throughout the area.

Ditches have been constructed and streams have been straightened to improve sluggish drainage conditions. Surface drainage in the Illinoian drift covered uplands is quite often accomplished by shallow surface ditches.

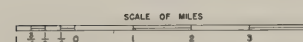
A stream gaging station is located on the Ohio River at Markland (12). The drainage area of Indian Creek is about 141 square miles (12). The drainage area of the Ohio River above Markland is about 83,000 square miles (12).

Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1947.



DRAINAGE MAP SWITZERLAND COUNTY INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
STATE HIGHWAY COMMISSION OF INDIANA
AT
PURDUE UNIVERSITY
1947



POLYCONIC PROJECTION

REDRAWN BY M. DENNEY & G. NOFFAL

TIPPECANOE COUNTY

GENERAL NATURE OF THE COUNTY

Tippecanoe County is located in the north-central part of the state. Its area is approximately 501 square miles (1). Lafayette, the county seat, is about 60 miles northwest of Indianapolis.

Mean annual precipitation is 38.26 inches at West Lafayette (2). An average annual snowfall of from 20 to 25 inches can be expected.

Tippecanoe County lies wholly within the Tipton Till physiographic region of the state (3). In respect to its physiographic situation in the United States, the county is in the Till Plains section of the Central Lowland province (3).

The surface of the county is that of a glacial plain broken by the valleys of the Wabash River and its tributaries. It is ridged by moraines. Maximum local relief is about 185 feet (3). Morainic topography is undulating. High mounds are found in the eastern and southwestern parts. Plain tracts are common. The highest point is in the southeast corner of the county. The Wabash Valley is the dominant feature in the county. The valley floor of the Wabash River consists of nearly level bottom lands and terraces. Local depressed areas occur in both till plain and morainic areas. Small knolls and basins are found near Mulberry. There is a broad depression along Little Wea Creek.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both glacial and recent in origin. Bedrock in the northeastern half of the county consists of strata of Devonian age. In the southwestern part they belong to the Mississippian age. The outcrops that do occur are mostly along the larger streams. Rock is exposed near Klondike and West Point.

The entire county is mantled with Wisconsin glacial drift (3). The thickness of the drift varies from nearly zero to over 300 feet. In places the drift has been masked by aeolian deposits. The drift is thickest in the filled valley of the preglacial Teays River and its tributaries, chief of which is the preglacial Anderson River. Drift is relatively thin at Buck Creek and West Point. The Bloomington morainic system crosses the county in a nearly east-west direction (10). Scattered ridges of this system are to be found in nearly all parts of the county except the northeast corner; in some parts the features are rather prominent.

The soils of the county have been developed from glacial materials (5). Some of these materials have been reworked by wind and water. Upland area soils are of the Parr, Miami, Carrington, and Russell catenas. Fox, Abington, Westland, Delphi, and Warsaw soils occur on the granular deposits. Clyde soils are found in the depressions. Alluvial soils are of the Genesee catena. Organic soils exist in depressions; some muck and peat occur. Subsoils are moderately permeable in sloping uplands to slowly permeable in depressions and nearly level areas (6). River valley subsoils are mostly permeable.

There is much granular material in the county (7). Deposits occur along the Wabash River and along the Wea and Wildcat creeks. Knolls and ridges of granular material are scattered over the area. Gravel has been found along the Tippecanoe River, Burnetts Creek, and Flint Creek. Preglacial subsurface valleys contain granular materials. Subsurface deposits of granular materials occur in places. Areas producing sand

and gravel are to be found in the central, southern, eastern, and northwestern parts. Hills of granular material exist between West Point and Taylor. They are also scattered over much of the southern and eastern parts of the county. The Raub esker is a prominent granular ridge. Other granular ridges are found in the southern part along the Wea Creek system. Sand dunes are found on Wabash River terraces northwest of West Point, southwest of West Lafayette, and north of Lafayette. In addition to those in the northwestern corner of the county, sand ridges are found south of Shadeland, and south and east of Elston. There is a sandy undulating tract near Octagon.

DRAINAGE FEATURES

Tippecanoe County lies wholly within the Wabash drainage basin of the state (3). The east-central part (about one-fourth of the county) is in the Wildcat subdivision of the basin. A small area in the northeastern part is in the Tippecanoe subdivision and a small area in the southeastern corner is in the Sugar Creek subdivision.

The Wabash Valley acted as a glacial sluiceway. Surface drainage is best developed in the uplands adjacent the Wabash River and its principal tributaries. Wildcat Creek has a rather prominent valley in the county. Flint Creek contacts rock near West Point. The crests of sections of moraines mark watershed divides in the county. The presence of the moraines adds somewhat towards intensifying the density of the drainage patterns. Control of stream courses and some stream deflections can be attributed, at least partially, to the moraines. The Wabash River crosses the morainic area. Noticeable are the deflections of Burnetts Creek, Lauramie Creek, the Wea Creek and South Fork Wildcat Creek in their courses to the Wabash River. There are flood water flumes in the Wabash Valley. The Wabash River flows close to its left valley wall in the northeastern part, north of Lafayette, and in the southwestern part its right bank is close to the valley wall. The Wabash has formed a post-glacial channel in the northeast and southwest parts of the county. Local basins occur in nearly all parts of the county. Terraces have good internal drainage; only perennial streams can be traced across them. There is a remarkable alignment in portions of the courses of Indian and Burnetts creeks. The Wabash River flows in the surface expression of the preglacial Teays valley north of Lafayette.

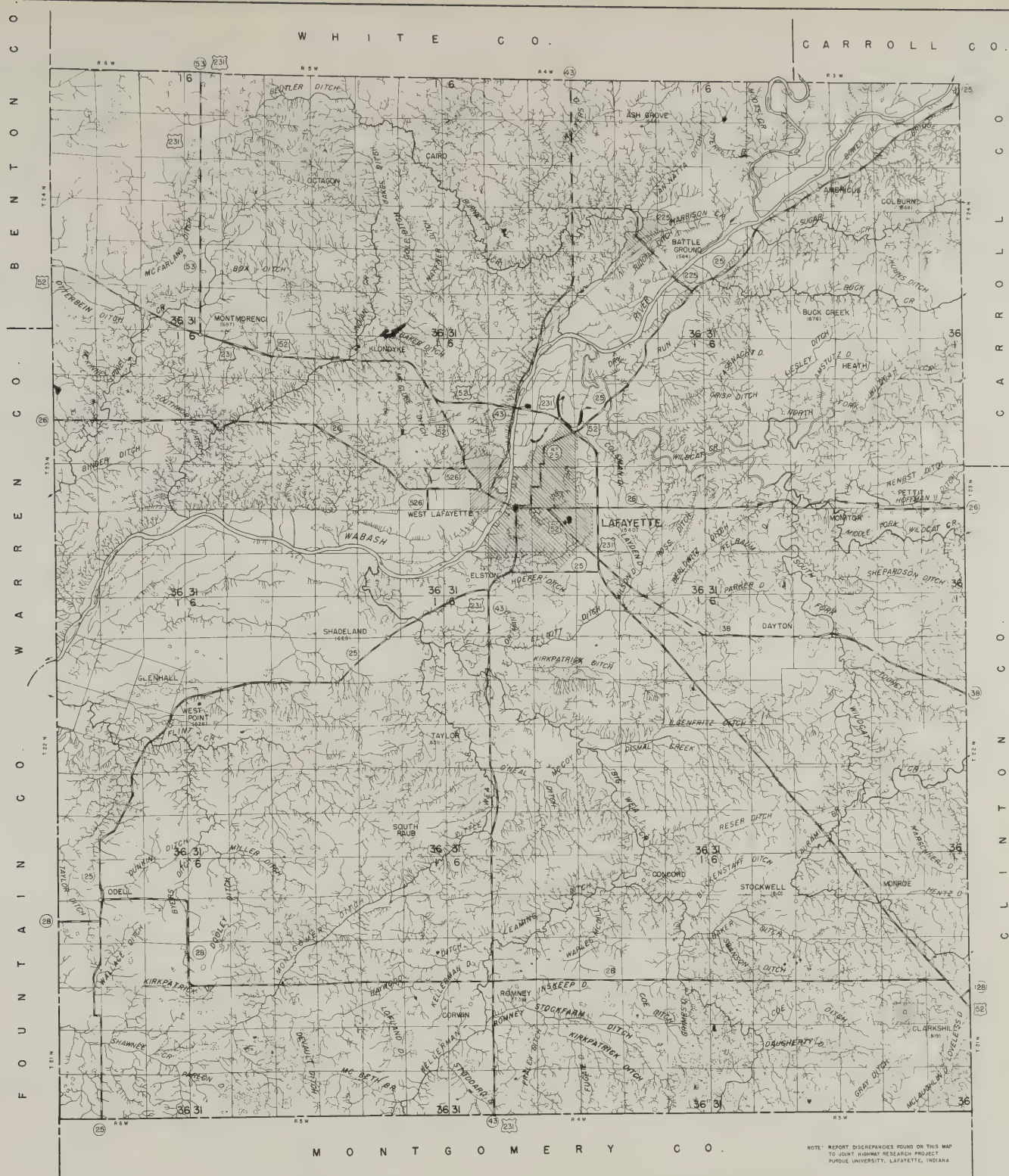
Hadley's Lake, northwest of Lafayette, is the only natural lake in the county. Numerous ponds of various origins are scattered over the area. A bayou is found in the Wildcat Creek valley.

Ditches have been constructed to improve sluggish drainage conditions in the nearly level and low-lying sections of the county. In some instances, principal streams have been dredged in portions of their courses.

Stream gaging stations are located on the Wabash River at Lafayette and on the South Fork Wildcat Creek near Lafayette (12).

The Tippecanoe River has a drainage area of about 1,920 square miles; and the Wildcat Creek, about 800 square miles (11). The drainage area of the Wabash River above Lafayette is about 7,430 square miles (11).

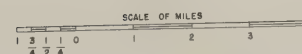
Note: The drainage map was prepared from 1938-1939 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1949.



DRAINAGE MAP TIPPECANOE COUNTY INDIANA

PREPARED FROM
1939 AAA AERIAL PHOTOGRAPHS
BY
STATE HIGHWAY COMMISSION OF INDIANA
AT
PURDUE UNIVERSITY

1948



TIPTON COUNTY

GENERAL NATURE OF THE COUNTY

Tipton County is located in the north-central part of the state. Its area is approximately 261 square miles (1). Tipton, the county seat, is 35 miles north-northeast of Indianapolis.

From data obtained in surrounding counties, the mean annual precipitation should be about 38 inches (2). An average annual snowfall of from 20 to 25 inches can be expected.

Tipton County lies wholly within the Tipton Till Plain physiographic region of the state (3). In respect to its physiographic situation in the United States, the county is in the Till Plains section of the Central Lowland province (3).

The surface of the county is that of a gently undulating glacial plain (3). It is only slightly broken by the valleys of the principal streams and interrupted by morainic knolls and swells in the western part. Maximum local relief is about 40 feet (3). Till plains are extensive. Morainic areas are only slightly undulating. Till plain areas contain shallow basins in some places. Some undulating terrain is found in the southwestern part.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock in the southwestern third of the county consists of strata of Devonian age. In the remainder of the county they belong to the Silurian age. There are no known rock outcrops in the county.

All Tipton County was glaciated (3). Surface drift is Wisconsin in age. The drift varies in thickness to more than 300 feet in the southwest corner. It is presumably deepest in the filled, preglacial Anderson River. A portion of the Bloomington moraine covers the western side of the county (10).

The soils of the county have been derived from glacial materials, some of which have been reworked by wind and water (5). Upland soils belong to the Miami catena. Alluvial soils belong to the Genesee catena. Most of the depressions shown on the map contain soils of high organic content. In many cases they have been classified as muck and/or peat. Clyde soils also occur in the depressions. Subsoils are moderately permeable in sloping areas and slowly permeable in depressions and nearly level sections (6).

Deposits of sand and gravel occur in many parts of the county (7). They occur in the flood plain of Broad Creek, in knolls, along Mud Creek, Turkey Creek, Duck Creek, Cicero Creek, and in old filled valleys. Sub-surface gravel has been found near Kempton.

DRAINAGE FEATURES

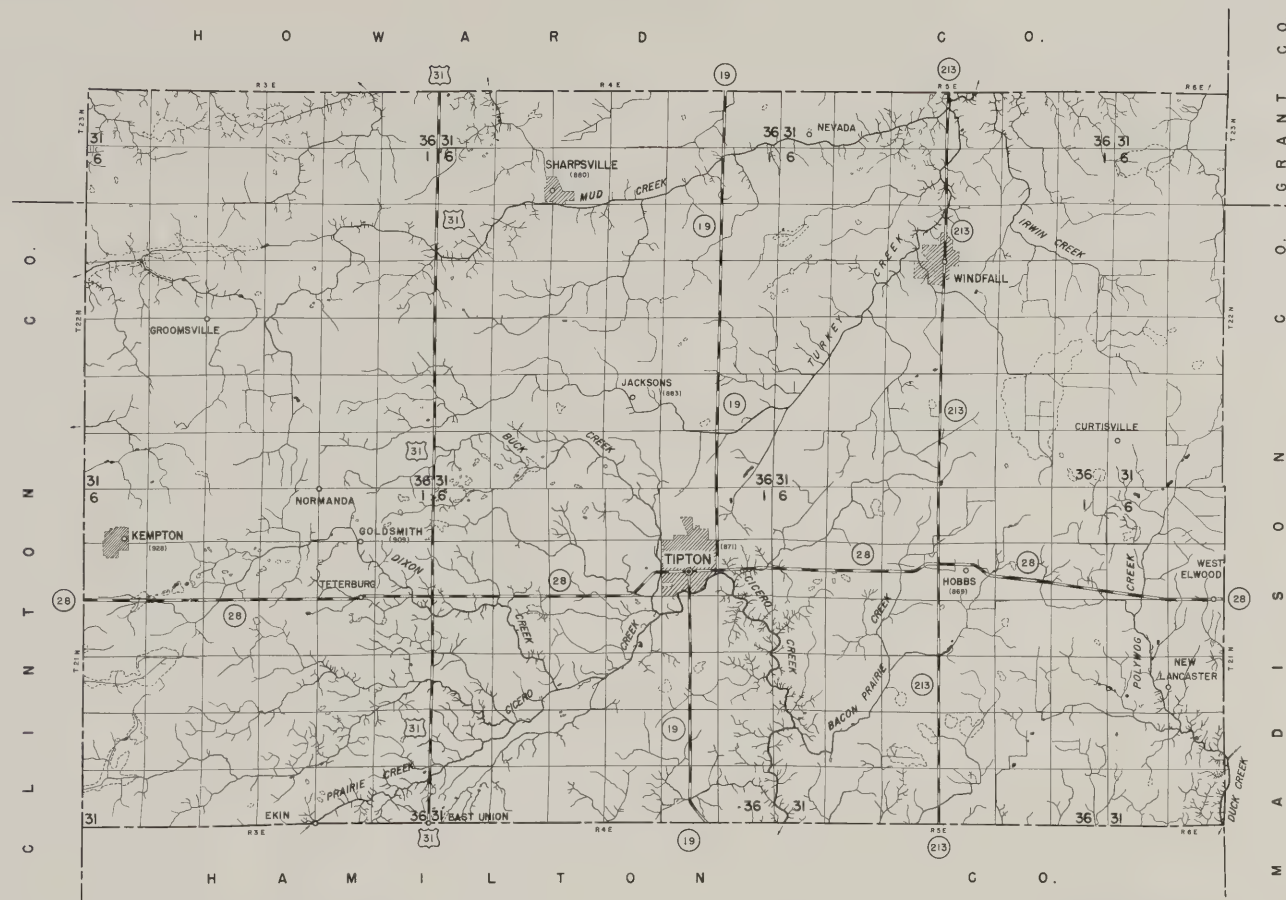
Tipton County lies within two major drainage basins of the state (3). The northern part of the county is in the Wildcat subdivision of the Wabash basin and the southern part is in the White River basin.

Many streams have low gradients. The headwater streams are mere channels without noticeable valley formation. Natural drainage is perhaps best developed adjacent the principal streams. Polywog Creek has a wide curving course in the eastern part of the county. The general direction of flow of the drainageways of central Indiana is westerly. In Tipton County many streams which rise in the western part of the county flow in an easterly direction. In the central and northeastern parts their courses change more or less abruptly before they join other streams following the normal trend. Thus the remarkably curving courses of Cicero and Mud creeks, as well as some locally deflected stream courses, can be attributed, at least partially, to the presence of a section of moraine. The crest of the moraine in the western part of the county defines a watershed divide. There are a few streams in the northwestern part that drain in a westerly direction.

There are no natural lakes in Tipton County. However, numerous farm ponds and water-filled gravel pits are to be found in widely scattered sections.

Many of the stream channels have been straightened and deepened by dredging. Depressions have been drained by the construction of wide, open ditches.

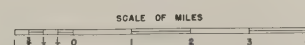
Note: The drainage map was prepared from 1939 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1951.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP TIPTON COUNTY INDIANA

PREPARED FROM
1939 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1951



POLYCONIC PROJECTION

UNION COUNTY

GENERAL NATURE OF THE COUNTY

Union County is located in the southeastern part of the state. Its area is approximately 168 square miles (1). Liberty, the county seat, is 70 miles southeast of Indianapolis.

From data obtained in surrounding counties, the mean annual precipitation should be about 39 inches (2). An average annual snowfall of from 15 to 20 inches can be expected.

Union County lies wholly within the Dearborn Upland physiographic region of the state (3). In respect to its physiographic situation in the United States, it is in the Till Plains section of the Central Lowland province (3).

The surface of the county is that of a glaciated plain broken by the valleys of East Fork Whitewater River, its tributaries, and by the Four Mile Creek system. Dissection is greatest along the East Fork Whitewater River. Maximum local relief is about 250 feet (3). The eastern half of the county is slightly rolling; it is almost level along the divide between Hannahs Creek and Four Mile Creek. The east Fork Whitewater River is encroaching upon the glacial upland surface. The river terraces are nearly level.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock in the northeastern quarter of the county consists of strata of Silurian age. In the remainder of the county they belong to the Ordovician age. Limestone outcrops in the valley of the East Fork Whitewater River.

All Union County was glaciated (3). Surface drift is Wisconsin in age (3). The drift varies in thickness according to the preglacial topography. In places the material is 75 feet or more in depth. No moraines are present within the confines of the county, although a section of the Hartwell moraine comes in contact with the northwest corner (9).

The soils of the county have been derived from glacial materials, some of which have been reworked by water (5). They have been influenced on the steep slopes by the bedrock, especially along East Fork Whitewater River. Upland soils belong to the Miami and Russell catenas. Fairmount soils are formed on limestone-shale. Fox soils occur on the granular deposits. Depression areas have Cope and Westland soils. Alluvial soils are of the Genesee catena. In most of the uplands subsoils

are moderately to slowly permeable (6). Small areas in the south-central part have very slowly permeable subsoils. River valley subsoils are mostly permeable.

Granular materials are found in the valleys of East Fork Whitewater River and its tributaries (7). Some gravel is found along Four Mile Creek. Local deposits are found in the small streams. Areas producing sands and gravels are located mostly in the western half of the county.

DRAINAGE FEATURES

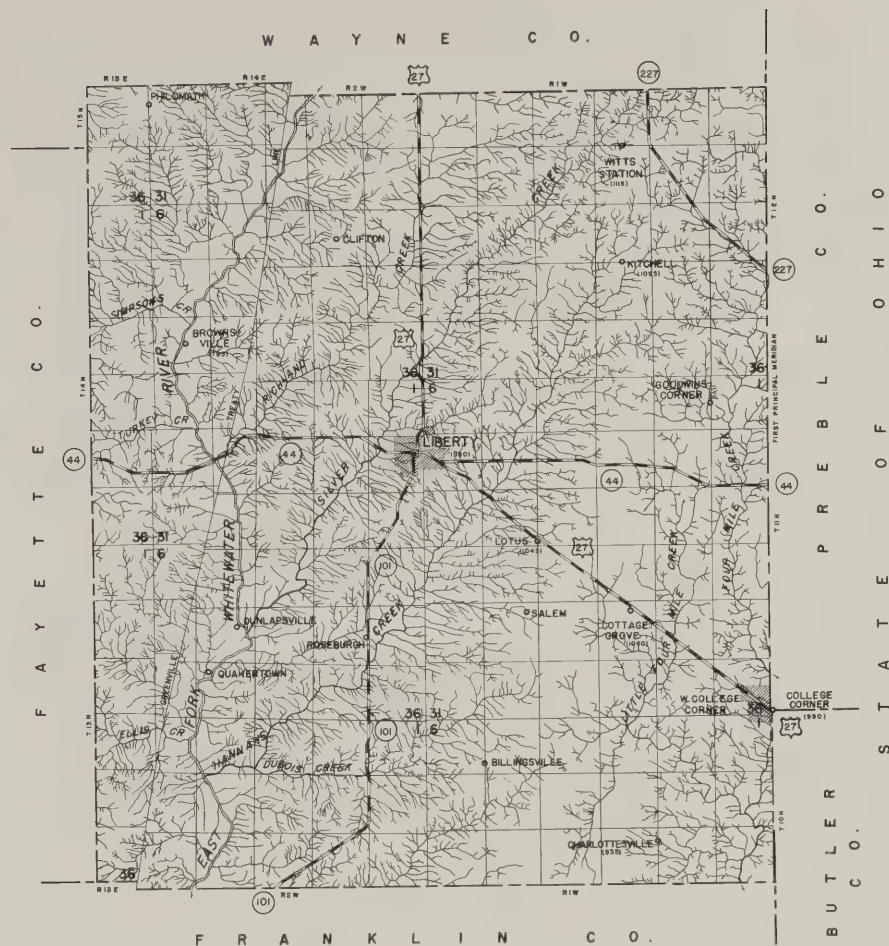
Approximately three-fourths of Union County lies in the Whitewater drainage basin of the state (3). The remainder (the eastern fourth) drains into Ohio; it is a part of the Miami River drainage basin.

The trend of the drainage is in a southerly direction. Both East Fork Whitewater River and Four Mile Creek flow south. Surface drainage is best developed along the valleys of the East Fork Whitewater River and its major tributaries. The valley of the East Fork Whitewater River is broad. Some streams flow on rock in portions of their courses. Streams flowing on rock exhibit minor deflections due to the resistant and nonresistant strata. A local watershed divide in the northwest corner possibly can be associated with a section of the Hartwell moraine. Few local basins occur. Drainage patterns are fine-textured in the dissected areas. Little Four Mile Creek is deflected sharply. Some of its tributaries flow in a northerly direction in their headwater reaches. Streams are widely spaced in the eastern part. The watershed divide is a fairly level tract in this section. Richland, Silver, and Hannah creeks are nearly parallel to each other. Tributaries of East Fork Whitewater River from the west are relatively short.

There are no natural lakes in Union County. Ponds of various origins are scattered throughout the area.

Some ditches have been constructed in the nearly level areas.

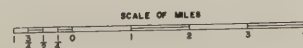
Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1946.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP UNION COUNTY INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1946



POLYCONIC PROJECTION

REDRAWN BY: M. DENNEY

VANDERBURGH COUNTY

GENERAL NATURE OF THE COUNTY

Vanderburgh County is located in the southwestern part of the state. Its area is approximately 241 square miles (1). Evansville, the county seat, is 145 miles southwest of Indianapolis.

Mean annual precipitation is 43.16 inches at the Evansville airport and 40.46 inches at Cypress (Dam 48) (2). Average annual snowfall is expected to be slightly more than 15 inches.

Vanderburgh County lies wholly within the Wabash Lowland physiographic region of the state (3). In respect to its physiographic situation in the United States, the northwest corner of the county is in the Till Plains section of the Central Lowland province and the remainder is in the Interior Low Plateaus province (3).

The surface of the county consists of nearly level, broad bottom lands along the Ohio River and other streams with intervening uplands which are rolling to more or less hilly. There are some high ridges in the western part of the county. Maximum local relief is about 140 feet (3). In the hilly uplands of the central part, the valleys are V-shaped and the divides are sharp-crested. Long narrow ridges exist south of Flat Creek. In the rolling uplands in the northern and eastern parts the divides are fairly broad. Some isolated hills exist east of Evansville. The aggraded valleys are nearly flat. River terraces are nearly level. Plain topography exists in the vicinity of Flat Creek.

The surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock consists of strata of Pennsylvanian age. Outcrops of limestone, sandstone, and shale occur in various parts of the upland. Coal is mined in the county.

Apparently only a small portion of the county was glaciated (3). Although the drift border crosses the northwest corner of the county, the Illinoian glacier left no noticeable moraine. The county did feel the effects of glaciation, however, in the formation of numerous glacial lakebeds and post-glacial loessial deposits. These somewhat mask the drift border. The drift relatively thin and the border rather indistinct although there are a few knolls scattered along its length. The only indication of a moraine is the presence of these knolls. Preglacial valleys have been filled to a considerable depth with glacial materials.

The soils of the county have developed from residual, glacial, aeolian, and water-deposited materials (5)(57). Upland soils belong to the Hosmer, Zanesville, Memphis, and Alford catenas. Soils of the lake plains belong to the Princeton, Markland, and Elkinsville catenas. Soils of the Ohio River terraces are of the Wheeling and Woodmere catenas. Ohio River bottom land soils are of the Huntington catena. Soils of the aggraded valleys are of the Pope, Adler-Inglefield, and Algiers catenas. Some depressions contain soils of high organic content. Upland subsoils are moderately to slowly permeable depending upon the topography (6). Lakebeds have slowly permeable subsoils. River valley subsoils are mostly permeable.

Gravel has been obtained from Ohio River bars (7). Small deposits of coarse sands and gravels are found in the flood plains (57). Areas producing sands and gravels are located in the central-southern part. Sand streaks occur in alluvial areas. Most upland areas are covered with loess of varying depth (17). The loess is fairly deep on the ridge tops (20).

Lakebed areas occur along Flat Creek, Bar Creek, and Pigeon Creek. Other valleys are aggraded (17).

DRAINAGE FEATURES

Although the northwestern and west-central parts of the county drain into the Wabash River, the entire county is included in the Minor Ohio drainage basin of the state (3).

Principal streams of the area flow in wide, nearly flat valleys. Many streams in the northwestern part have low gradients. Their valleys are alluviated. Small streams are intermittent. The flood plains of the Ohio River are quite wide in places. Streams entering the Ohio River have aggraded valleys in their lower reaches. Natural drainageways are well developed in the upland areas. Some streams flow on bedrock in portions of their courses. Noticeable is the deflected course of Pigeon Creek. Drainage is integrated in many upland areas. Slight differences in the densities of the fine-textured drainage patterns can be detected in the eastern and western parts of the uplands. In general, the glaciated uplands are about as dissected as the unglaciated areas. The alluviated valleys extend far into the dissected uplands. The watershed divide of the Big Creek system separates Ohio River drainage from Wabash River drainage. Ohio River bottom lands are marked by curving intermittent drainageways. Local depressions occur in the flood plains. Headwater streams of Pigeon Creek seem to have been affected by glaciation (9). Remnants of the Wabash and Erie Canal still exist in the eastern part of the county.

There are no natural lakes in the county. There are, however, a few artificial lakes and a number of ponds of various origins scattered throughout the county.

Dredged ditches have been constructed to improve drainage conditions; these are numerous in the lakebed and bottomland areas.

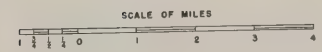
Stream gaging stations are located on the Ohio River at Evansville and near Cypress (12). The drainage area of the Ohio River above Evansville is about 107,000 square miles (12).

Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1951.



DRAINAGE MAP VANDERBURG COUNTY INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1951



POLYCONIC PROJECTION

VERMILLION COUNTY

GENERAL NATURE OF THE COUNTY

Vermillion County is located in the western part of the state. Its area is approximately 236 square miles (1). Newport, the county seat, is 70 miles west-northwest of Indianapolis.

From data collected in surrounding counties, the mean annual precipitation should be about 39 inches (2). An average annual snowfall of about 20 inches can be expected.

All Vermillion County lies within the Tipton Till Plain physiographic region of the state (3). In respect to its physiographic situation in the United States, it is in the Till Plains section of the Central Lowland province (3).

The surface of the county is that of a glacial plain broken by the valleys of the Wabash and Vermillion rivers and their tributaries. It is ridged by sections of a morainic system which crosses the central part. Maximum local relief is about 140 feet (3). Interstream areas of the uplands are nearly level; this is especially true of the southern third of the county. Stream dissection is great adjacent to the Wabash River. The Wabash Valley wall is quite steep in the southern and central parts. Morainic topography is a gentle swell and sag type. The Vermillion River is deeply entrenched; streams have severely dissected its valley walls. There is a well defined ridge near Eugene. The valley floor along the Wabash River varies from very narrow to more than a mile in width. It is wide near Cayuga and Clinton. Basins in the upland areas are rather shallow.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock consists of strata of Pennsylvanian age. Rock outcrops in various places; and shale is exposed along Vermillion River north of Cayuga. Coal outcrops along the Little Vermillion River.

All Vermillion County was glaciated (3). Surface drift is of Wisconsin age. The drift varies in thickness to more than 100 feet according to the preglacial topography. Vermillion County is crossed in an east-west direction by two ridges of the Champaign morainic system (8). Their crests are poorly defined; and they are slightly undulating, having only low knolls.

The soils of the county have been developed mainly from glacial materials, some of which are local in character and reworked by wind and water (5)(58). Upland soils belong to the Lordstown, Carrington, and Russell catenas. Fox, Westland, and Warsaw soils occur on the granular deposits. Alluvial soils are of the Genesee catena. Clyde soils are found in the depressions. Upland subsoils vary from moderately permeable to slowly permeable depending upon the topography (6). River valley subsoils are very permeable.

There are extensive terraces of granular material along the Wabash River (7). Areas producing sands and gravels are located in the eastern part. Gravel has been found along Vermillion River, Little Vermillion River, Spring Creek, Coal Creek, Nortons Creek, and Brouillettes Creek. Some loess has been observed as covering uplands near the Wabash Valley. Subsurface soils have been found in various areas (6).

DRAINAGE FEATURES

Vermillion County lies wholly within the Wabash drainage basin of the state (3).

The trend of the drainage is easterly to the Wabash River which flows south. The Wabash Valley acted as a glacial sluiceway. The river flows in a preglacial valley. Internal drainage is excellent in the granular terraces. Natural drainage is best developed near the valleys of the Wabash River, the Vermillion River, Little Vermillion River and their tributaries. Many streams flow on rock in portions of their courses. The effect of rock control is exhibited by the angular bends of the Vermillion River. The courses of the natural drainageways have been interrupted by the active strip mining of coal. Stream valleys in the uplands are shallow. Terrace faces are relatively steep. Much of the drainage basin of Vermillion River lies in Illinois. Some of its headwater streams are in Warren and Benton counties, Indiana. Other streams having their headwaters in Illinois are Little Vermillion River and Brouillettes Creek. Local watershed divides only can be defined by crests of sections of moraines in the county. Possibly some stream deflection can be attributed to the moraines. Drainage patterns are fine-textured in the morainic areas. Local depressions occur in various parts of the county. Some of the small streams from the uplands are deflected by granular terraces in the Wabash Valley. Nortons Branch is deflected north of Clinton.

There are no natural lakes in the county. Ponds of various origins are scattered throughout the area.

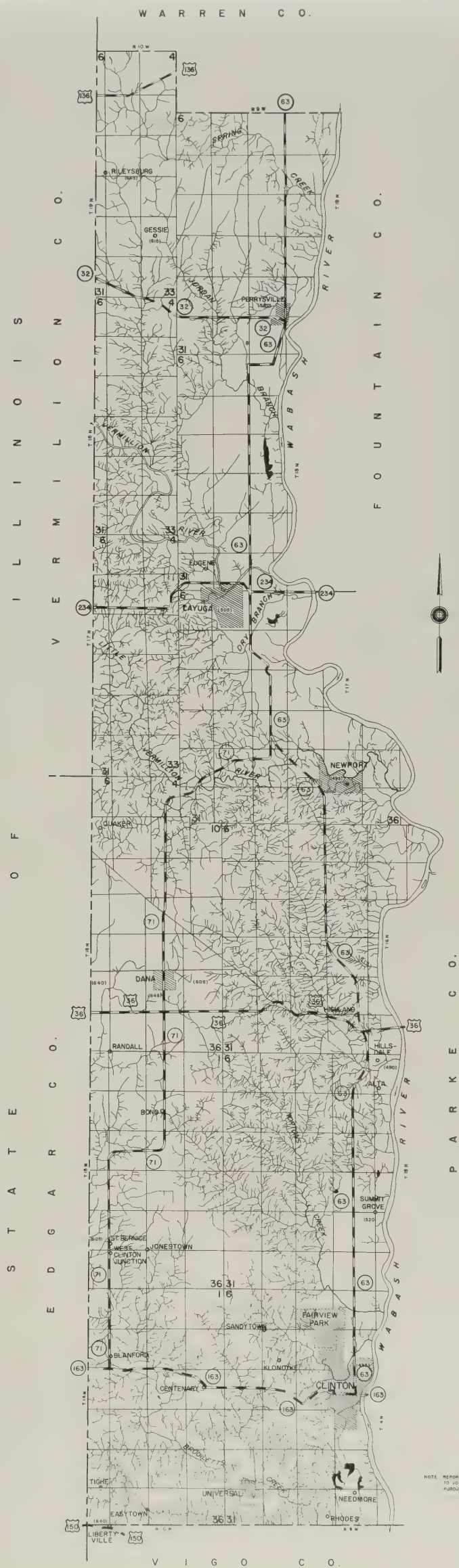
Ditches have been constructed to improve drainage conditions in the nearly level areas.

Stream gaging stations are located on the Wabash River at Montezuma and Clinton (12). The Vermillion River drains about 1,500 square miles before it enters Indiana from Illinois (8). Both Little Vermillion River and Brouillettes Creek drain considerable areas of Illinois, also.

Note: The drainage map was prepared from 1939 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1946.

DRAINAGE MAP
VERMILLION COUNTY
INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1952



NOTE REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

VIGO COUNTY

GENERAL NATURE OF THE COUNTY

Vigo County is located in the western part of the state. Its area is approximately 415 square miles (1). Terre Haute, the county seat, is 75 miles west-southwest of Indianapolis.

Mean annual precipitation is 39.57 inches at Terre Haute (2). An average annual snowfall of about 20 inches can be expected.

The northwestern corner of Vigo County is in the Tipton Till Plain physiographic region of the state (3). The remainder is in the Wabash Lowland. In respect to its physiographic situation in the United States, the county is in the Till Plains section of the Central Lowland province (3).

The surface of the county is that of a glacial plain broken by the valleys of the Wabash River and its tributaries. The northwestern corner is ridged by a moraine. Maximum local relief is about 100 feet (3). The Wabash Valley walls are dissected. The southeastern part of the county is gently undulating and only somewhat dissected. The Splunge Creek valley is broad and nearly level. The Wabash Valley is divided into flood plains and terraces. It is wide. In the county the river flows near the western side of the valley. The land adjacent to many of the streams tributary to the Wabash River is quite rolling. The moraine in the northwest part is marked by occasional knolls. Atherton Island is a dissected upland area extending into Vigo County from Parke County.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock consists of strata of Pennsylvanian age. The formations are shales, sandstones, and coals. Outcrops of these rocks are to be found along the major drainage-ways in nearly all parts of the uplands. Shale and sandstone outcrop along Coal Creek. Rock forms the beds of several of the small streams in the northwestern part.

All Vigo County was glaciated (3). Wisconsin glacial drift covers the northwestern corner and the surface drift in the remainder of the county is Illinoian in age. Drifts of both ages are exposed in some stream valleys. The border between the two drifts is indistinct in some parts. The drift varies in depth according to the preglacial bedrock topography, being more than 100 feet in places. The Shelbyville moraine crosses the northwestern corner in a northeast-southwest direction. There is a small range in altitude along the moraine. Terraces of Wisconsin age exist in the Wabash Valley.

The soils of the county have been developed mainly from glacial materials, many of which have been reworked by wind and water (5). Wisconsin glacial soils belong to the Russell catena. Illinoian glacial soils belong to the Cincinnati catena. Loessial soils belong to the Alford catena. Fox soils occur on the granular deposits. Alluvial soils are of the Genesee catena. Upland subsoils vary from mostly permeable to very slowly permeable depending upon topography and texture and structure of soil layers and underlying materials (6). Small areas in the western and eastern parts have very slowly permeable subsoils. Loessial and sandy area subsoils are mostly permeable. River valley subsoils are mostly permeable.

Much granular material is to be found in the terraces of the Wabash Valley (7). Areas producing sands and gravels are located mainly along the river and in the southwestern corner of the county. Gravel has been found along Brouillettes Creek, Lost Creek, Spring Creek and Prairie Creek. Sand dunes are found on the terraces on the eastern side of the Wabash River. Some sand is found east of the Wabash Valley in both the southern and northern parts.

Portions of the county east of the river are covered with loess of varying depths (20).

DRAINAGE FEATURES

Vigo County lies within two major drainage basins of the state (3). About 25 square miles in the southeastern part is in the Eel subdivision of the White River basin. The remainder of the county is in the Wabash basin.

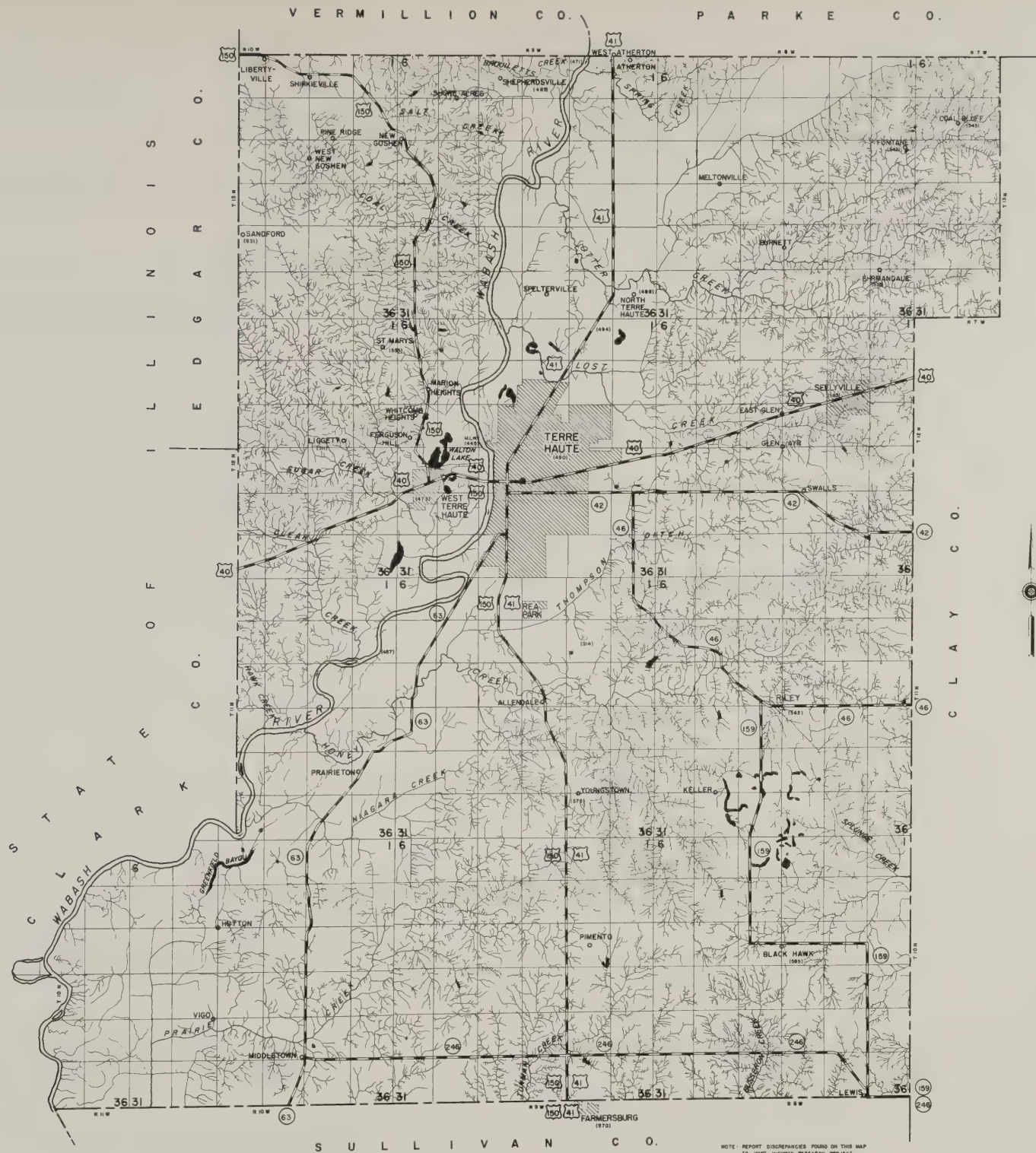
Several stream valleys in the southern part are narrow and shallow. East of the Wabash River the drainage lines tend to follow the dip of the bedrock strata. In areas where the strip mines are being actively operated, drainage systems are interrupted and the courses of the streams are changed from time to time. Surface drainage is best developed along the valleys of the Wabash River and its principal tributaries. The gradient of the Wabash River varies from about 6 to 8 inches per mile. The Wabash River valley acted as a glacial sluiceway (18). The river flows in a preglacial valley. Local basins occur in various parts. Several streams in the northwestern part have their sources in Illinois. At least a portion of the Prairie Creek valley is an old glacial meltwater channel. Splunge Creek has a low gradient. Local watershed divides can be defined by bedrock and by the crests of sections of moraines in the county. Some stream courses appear to be associated with the moraine. Drainage patterns are fine-textured in the dissected portions of the morainic area. Drainage patterns are noticeably different in the eastern, central and western parts of the county, indicating changes in surface materials. Streams such as Spring, Otter, Lost, Honey, and Prairie creeks appear to be deflected near the Wabash River by valley terraces. The south branch of Honey Creek flows in a northerly direction. A cut-off in the Wabash River has isolated a portion of Indinan into an island-like tract. A watershed divide exists across the southeast corner of the county.

There are no natural lakes in the county. Ponds of various origins are scattered over the area.

Ditches have been constructed to improve sluggish drainage conditions. Some streams have been straightened.

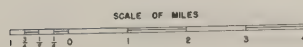
A stream gaging station is located on the Wabash River at Terre Haute (12). The drainage area of the Wabash River above Terre Haute is about 12,200 square miles (12).

Note: The drainage map was prepared from 1939 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1946.



DRAINAGE MAP VIGO COUNTY INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1952



POLYCONIC PROJECTION

REDRAWN (1957) BY: M. DENNEY

WABASH COUNTY

GENERAL NATURE OF THE COUNTY

Wabash County is located in the north-central part of the state. Its area is approximately 421 square miles (1). Wabash, the county seat, is 75 miles north-northeast of Indianapolis.

Mean annual precipitation is 38.23 inches at Wabash (2). An average annual snowfall of from 25 to 30 inches can be expected.

The southern part of Wabash County lies in the Tipton Till Plain physiographic region of the state (3). The northern part is in the Steuben Morainial Lake section of the Northern Moraine and Lake region. In respect to its physiographic situation in the United States, the southern part of the county is in the Till Plains section of the Central Lowland province and the northern part is in the Eastern Lake section of the same province (3).

The surface of the county is that of a glacial plain broken by the valleys of the Wabash, Eel, Salamonie, and Mississinewa rivers and their tributaries. It is ridged by moraines. The most conspicuous topographic features are the river valleys. Maximum local relief is about 120 feet (3). Rock ridges and dome-like hills occur in the Wabash Valley. Inter-morainic, or till plain, areas are gently rolling; they cover from a half to two-thirds of the county. West of Wabash are bluffs of rock on the south side of the river valley. A rather unique feature is the broad, nearly flat alluvial section of the Wabash Valley in the vicinity of Rich Valley. South of Lagro in the Wabash Valley is an abandoned channel (3). Lake basins are conspicuous in the northwestern part of the county. Morainic features are prominent in places, in others they are gently rolling.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock consists of strata of Silurian age. Limestone is exposed in the Wabash, Salamonie, and Mississinewa valleys. It is also found along Rush, Josina, Treaty, Lagro, and Helms creeks (30).

All Wabash County was glaciated (3). Surface drift is Wisconsin in age. The drift is as much as 400 feet deep in places. It is deepest in the buried valley of the preglacial Teays River. The county is traversed by sections of two moraines. The Mississinewa moraine extends from the southeast corner to Wabash then to the northeast corner (16). The Packerton moraine crosses the northwest corner in a northeast-southwest direction (5)(16).

The soils of the county have been developed mainly from glacial drift (5). Much of the material has been reworked by wind and water. Upland soils belong to the Miami and St. Clair catenas. Fox, Oshtemo, and Coloma soils are on the granular deposits. Alluvial soils are of the Genesee catena. Depressions have Clyde and Westland soils. Subsoils in the northwest corner are mostly permeable (6). In the central-western and south-western parts they vary from moderately to slowly permeable, depending upon topography. In much of the eastern third the subsoils are slowly to very slowly permeable. River valley subsoils are very permeable.

There are many gravel deposits (7) scattered over the county. Several of these are in knolls and ridges of the Packerton moraine. Granular materials also occur in the terraces and valley walls along the Mississinewa,

Salamonie, Wabash, and Eel rivers. Subsurface granular deposits occur. Areas producing sand and gravel occur near all four of the county's boundary lines. There are small areas of lacustrine nature in the northeastern, eastern, and western parts (16). Low sand dunes are found west of Long Lake.

DRAINAGE FEATURES

Wabash County is in the Wabash drainage basin of the state (3). The northwestern part is in the Eel subdivision, and most of the southwestern part is in the Mississinewa subdivision of the basin.

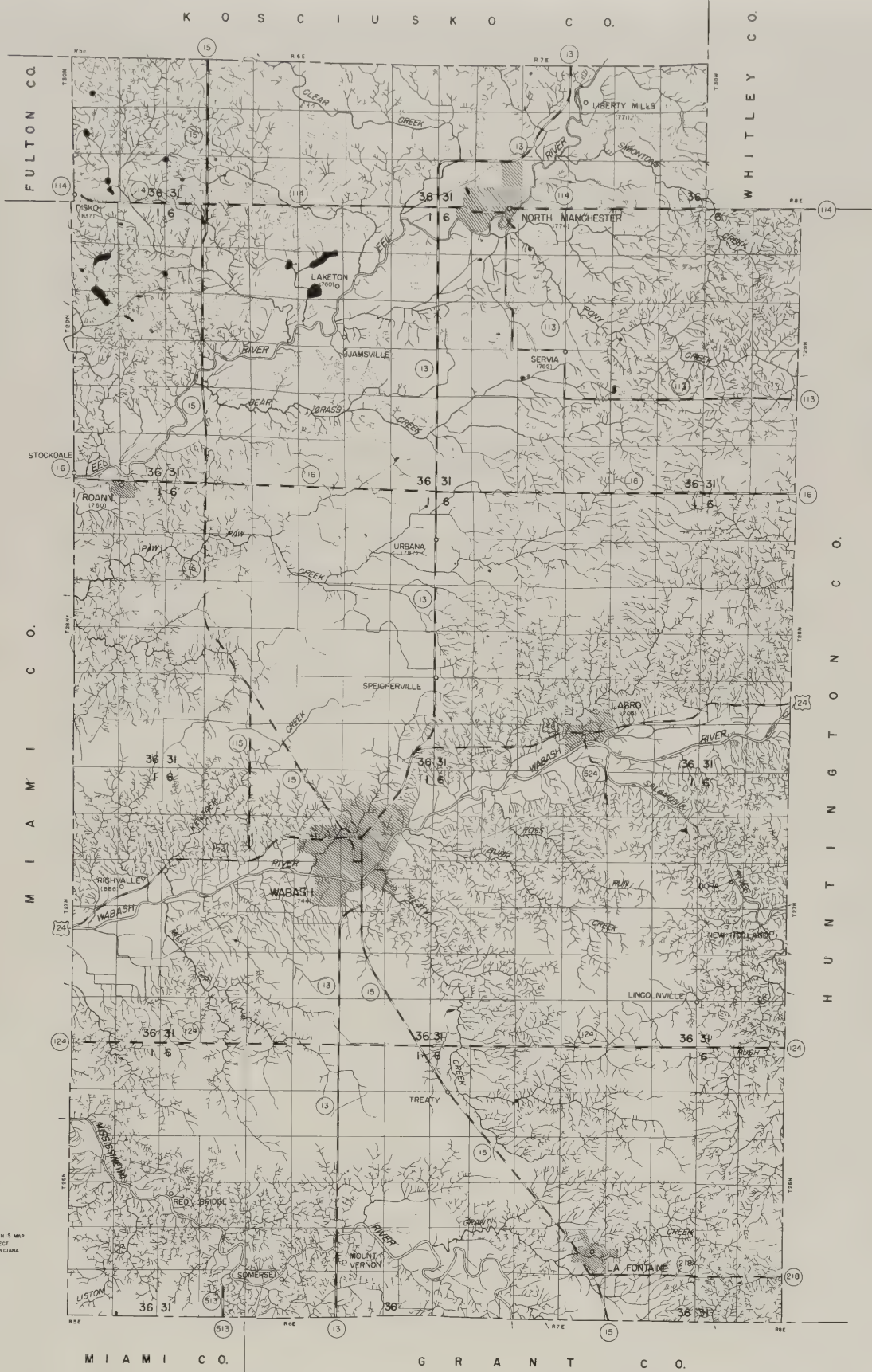
The Wabash River valley acted as a glacial sluiceway. The Wabash River flows through the surface expression of the buried Teays Valley near the town of Rich Valley (16). Some streams flow on rock in portions of their courses. Treaty Creek has a rock-walled valley near Wabash. Mill Creek contacts rock near the Wabash River. Terraces occur at intervals in the Wabash Valley. Drainage is best developed in the uplands adjacent the main streams. Crests of sections of moraines define watershed divides in the county. Some control on stream courses and some stream deflections can be attributed, at least partially, to the presence of the moraines. Drainage patterns vary from fine-textured in the eastern sections to haphazard in the northwestern morainic areas. The Wabash River crosses a morainic segment. Tributaries of Eel River have tortuous courses, some through morainic areas. The angular bends of the Mississinewa River are noticeable. The rivers are entrenched; also, many small tributary streams in the southern part are entrenched. The course of Treaty Creek may be controlled in part by the Mississinewa moraine. Bear and Pawpaw creeks are nearly parallel.

There are several natural lakes in the northwest part of the county. Ponds of various origins are scattered over the area. Lakes tend to stabilize the flow of their outlet streams. Some lakes are connected by streams. The lakes have a variety of size, depth, and outline of shore. A gaging station is located on Long Lake (12).

Ditches have been constructed to improve sluggish drainage conditions in the till plain areas. Many morainic basins have been drained artificially.

Stream gaging stations are located on the Wabash River at Wabash, on Eel River at North Manchester, and on the Salamonie River at Dora (12). The drainage area of the Wabash River above Wabash is about 1,810 square miles (11). The Salamonie River has a drainage area of about 510 square miles (11). The drainage area of Eel River above North Manchester is about 430 square miles (12).

Note: The drainage map was prepared from 1941 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1956.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP WABASH COUNTY INDIANA

PREPARED FROM
1941 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1956

SCALE OF MILES
1 2 3 4
1 2 3 4

WARREN COUNTY

GENERAL NATURE OF THE COUNTY

Warren County is located in the western part of the state. Its area is approximately 368 square miles (1). Williamsport, the county seat, is 75 miles northwest of Indianapolis.

Mean annual precipitation is 34.71 inches at Judyville (2). An average annual snowfall from 20 to 25 inches can be expected.

Warren County lies wholly within the Tipton Till Plain physiographic region of the state (3). In respect to its physiographic situation in the United States, it is in the Till Plains section of the Central Lowland province (3).

The surface of Warren County can be divided into two fairly smooth tracts and a hilly one. It is that of a glaciated plain broken by the valleys of the Wabash River and other major streams. It is ridged by moraines. Maximum local relief is about 150 feet (3). One area of nearly level land lies in the west-central part of the county; the other is in the northeastern part. These areas are gently undulating. Rather prominent morainic features lie in the eastern part of the county. Morainic topography is undulating to rolling; there are small knolls in the northern part. Stream dissection is greatest along the Wabash River and Pine Creek. Several other streams have deep valleys near the Wabash. The Wabash Valley varies in width; in places the valley floor is very narrow. Intermorainic areas are relatively smooth.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock consists, in the southwestern half of the county, of strata belonging to the Pennsylvanian age. In the northeastern half of the county the strata are of Mississippian age, although there are outliers of Pennsylvanian age within the area. The Mississippian rocks are limestones and shales; they outcrop along the valley wall of the Wabash from the eastern limits of the county to Williamsport. Shale is exposed along Pine Creek.

All Warren County was glaciated (3). Surface drift is Wisconsin in age. The thickness of the glacial drift varies from practically zero to more than 350 feet (13). The drift has been eroded from the valley walls of the principal streams and the bedrock exposed in many places. The greatest drift depth seems to be in the preglacial Teays River (13). Nearly half the county is morainic. Although the ridges do not all follow in the general east-west directional trend, they have been grouped in the Bloomington morainic system (9).

The soils of the county have been developed mainly from glacial materials, some of which are alluvial (5). Upland soils belong to the Miami, Parr, Carrington and Russell catenas. Fox and Warsaw soils occur on the granular deposits. Alluvial soils are of the Genesee catena. Organic soils are mucks and peat. Upland subsoils of the county vary from moderately permeable to slowly permeable depending upon topography (6). River valley subsoils are very permeable.

The Wabash Valley contains granular terraces composed of water-deposited materials (7). Other granular deposits in knolls and along streams are to be found in various parts of the county. Gravel has been found along Pine Creek, Kickapoo Creek, and Little Pine Creek. Areas producing sands and gravels are located along the Wabash River.

Some loess is found in the southern part. This covers a small upland area.

DRAINAGE FEATURES

Warren County is a portion of the Wabash drainage basin of the state (3).

The Wabash River valley is a glacial sluiceway. The river flows in a preglacial alluviated valley in the southern part. Much of the northwestern part and some of the western part of the county drain into Illinois, but the waters from these areas eventually reach the Wabash River. There are several small waterfalls in the tributaries of the Wabash River. Crests of sections of moraines define local watershed divides in the county. Some control on stream courses and some stream deflections may be attributed, at least partially, to the presence of the moraines. Pine Creek is entrenched in the county. Other streams entering the Wabash River have deep valleys, also. Many have rock exposed in their valley walls. Natural drainageways are best developed in upland areas adjacent the valleys of the Wabash River and its principal tributaries. Some streams flow on rock in portion of their courses. Local depressed areas occur in various parts. Drainage patterns throughout most of the morainic areas are fine-textured. Several tributaries of the Wabash River cross the moraine. Big Pine Creek has a very meandering course indicating rock control.

There are a few small lakes, mostly ponds, in the county. Kates Pond is considered to be the most southerly lake in the Wisconsin drift area of the state. Numerous other ponds of various origins are scattered over the area.

Ditches have been constructed to improve sluggish drainage conditions. Streams in the nearly level upland tracts have been dredged.

The drainage area of the Wabash River above Williamsport is about 8,180 square miles (11).

Note: The drainage map was prepared from 1950 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1955.

S T A T E O F I L L I N O I S
V E R M I L L I O N C O.

B E N T O N C O.

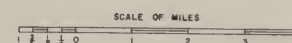
T O P P E C A N O E C O.



V E R M I L L I O N C O.

DRAINAGE MAP WARREN COUNTY INDIANA

PREPARED FROM
1950 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1955



WARRICK COUNTY

GENERAL NATURE OF THE COUNTY

Warrick County is located in the southwestern part of the state. Its area is approximately 391 square miles (1). Booneville, the county seat, is 135 miles southwest of Indianapolis.

Mean annual precipitation is 42.58 inches near Booneville, 43.44 inches at Decker, and 40.49 inches at Newburgh (2). An average annual snowfall of about 15 inches can be expected.

Warrick County lies wholly within the Wabash Lowland physiographic region of the state (3). In respect to its physiographic situation in the United States, it is in the Interior Low Plateaus province (3).

The surface of the county varies from the nearly level bottom lands to the rolling and somewhat hilly uplands. Maximum local relief is about 260 feet (3). The county is hilly near Booneville. There are some isolated hills of prominence in the northwestern part. There are others near the Ohio River. A noticeable high ridge occurs in the northeastern corner. Another occurs in the northern part. Warrick County has many aggraded valleys. They vary in width from one to three miles and are gently sloping. Several of these valleys extend far into the dissected uplands. Alluvial lands are drained by low-gradient, small streams.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Bedrock consists of strata of Pennsylvanian age. Sandstones, shales, and limestones outcrop in nearly all parts of the county. Coal outcrops in the central and eastern parts of the county.

Warrick County is in the unglaciated region of the state (9). Effects of glaciation are alluvial and aeolian deposits. Some stream course changes have been effected due to glaciation north of the county.

The soils have been derived from residual, aeolian, and water deposited materials (5). Sandstone-shale soils belong to the Zanesville catena. Loessial soils are of the Alford and Hosmer catenas. Lacustrine areas have McGary, Zipp, and Montgomery soils. Alluvial soils are of the Genesee, Huntington, and Pope catenas. Some depressions have soils of high organic content. The subsoils in the northeastern part are slowly permeable (6). Those in the central part are moderately to slowly permeable depending upon the topography. Lakebed subsoils are slowly permeable. In the southwest corner some subsoils are moderately permeable. Some river valley subsoils are permeable.

Gravel has been obtained from bars in the Ohio River (7). Deposits of local rock fragments occur in some of the upland streams. Lacustrine deposits occur along streams entering the Ohio River. This is noticeable in the northwest corner of the county. Deep loess has been mapped as covering the uplands in the southern and western parts of the county (20). Adjacent areas have silty top soils.

DRAINAGE FEATURES

Most of Warrick County lies in the Minor Ohio drainage basin of the state (3). Only a small area in the north-central part is in the Patoka basin.

The Ohio River valley acted as a glacial sluiceway (3). Streams entering the Ohio River are aggraded in their lower courses. Cypress Creek and the Pigeon Creek are principal among these streams.

The north-south trend of portions of Little Pigeon Creek and some of its tributaries indicates rock control. The abandoned Wabash and Erie Canal somewhat parallels Pigeon Creek from near Rosebud to a point about 3 miles north of Millersburg where it joins Pigeon Creek. The present course of Pigeon Creek in its entirety is probably the result of glaciation (9). Headwater streams of Pigeon Creek seem to have been affected by glaciation (9). A watershed divide extends in a northeast-southwest direction through the center of the county. Streams originating in the central-northern part drain in nearly all directions. Natural drainage is well developed in the upland areas. Drainage is integrated in many parts of the upland. Drainage patterns are fine-textured in the dissected uplands. Natural drainage in the lakebed areas has been supplemented by artificial means. Alluvial bottom lands in the Ohio River valley are marked by long, nearly parallel intermittent drainage-ways. Coles Creek and Pokeberry Creek are southerly flowing streams indicating rock control. The courses of natural drainage have been disrupted by strip mining operations in many parts of the county. The Ohio River bottom land is narrow east of Newburgh. Little Pigeon Creek parallels the Ohio River for about 1 1/2 miles above their junction.

There are no natural lakes in the county. Water-filled strip mine pits and ponds of various origins are scattered throughout the area.

Ditches have been constructed in the lakebed and bottom land areas. Some drainage changes have been affected by the dredging of certain streams.

A stream gaging station is located on the Ohio River at Newburgh (12). The drainage area of the Ohio River above Newburgh is about 97,800 square miles (12).

Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1950.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP WARRICK COUNTY INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1950



WASHINGTON COUNTY

GENERAL NATURE OF THE COUNTY

Washington County is located in the southern part of the state. Its area is approximately 516 square miles (1). Salem, the county seat, is 80 miles south of Indianapolis.

Mean annual precipitation is 43.59 inches at Salem (2). An average annual snowfall of at least 20 inches can be expected.

Washington County lies within four physiographic regions of the state. The northeast corner is in the Scottsburg Lowland. The southwest corner is in the Crawford Upland. The remainder of the county is about equally divided by a northwest-southeast line between the Norman Upland on the northeast and the Mitchell Plain on the southwest (3). In respect to its physiographic situation in the United States, the Scottsburg Lowland portion of the county is in the Till Plains section of the Central Lowland province and the remainder of the county is in the Highland Rim Plateau section of the Interior Low Plateaus province (3).

The surface of the county varies from that of a glaciated plain to a rough, stream-dissected escarpment, to an upland plain. Maximum local relief is about 400 feet (3). Bordering the northern part of the county are the nearly flat valleys of the East Fork White River and the Muscatatuck River. A small area has an elevation of more than 1,000 feet above sea level. The Knobstone escarpment extends from the southeastern part in an irregular line across the northeastern part to the northwestern corner. In the vicinity of Little York the till plain is gently undulating. A karst plain, almost devoid of surface streams, extends northward for several miles from the vicinity of Fredericksburg. The terrain has a pitted appearance as it does in other limestone areas. Large sinkholes are common. Sinkholes are sometimes found in sandstone areas because of underlying limestones. In the drift-covered areas the terrain is very gently rolling except near the streams where it becomes rolling because of the dissection. The southwestern part of the county is hilly. Terraces occur in the South Fork Blue River valley. East and northeast of Salem the valleys are broad and the long slopes descend from an uneven upland. Sharp-crested divides separate watersheds in the Knobstone escarpment region. The perfection and symmetry of the drainage lines in the Norman Upland area are notable features.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock consists of strata of Mississippian age. Limestones, sandstones, and shales outcrop in many parts of the county. There are a number of limestone quarries in the county. Sandstone caps the hills in the southwestern part. Limestone caps some of the ridges in the Norman Upland. The Mt. Carmel fault crosses the county in a north-south direction (3).

Illinoian glacial drift covers the northeastern part of the county (3)(28). The remainder is in the unglaciated region of the state. Drift varies in depth according to the underlying bedrock topography. On the steep slopes the drift has been removed by erosion. The drift border is irregular since it follows the serrated face of the Knobstone escarpment.

Upland soils have developed on residual and glacial materials (6)(59). Some have been reworked by water. Soils of the Illinoian drift areas are of the Cincinnati catena. Soils of the sandstone-shale areas belong to the Zanesville catena. Limestone area soils are of the Hagerstown and Frederick catenas. Sand areas have Princeton soils. Alluvial soils are of the

Genesee and Pope catenas. Some depressions have soils of high organic content. The eastern, northern, and southwestern parts have subsoils which are slowly permeable (6). A small section in the northeastern part has very slowly permeable subsoils. In most of the county the subsoils are moderately to slowly permeable. River valleys have subsoils which are mostly permeable.

Deposits of stream gravels occur locally (7). Areas producing sands and gravels are located in the central-northern part of the county. Some gravel has been obtained from the Muscatatuck River. Cherty gravels occur in the uplands in the northern part.

Lacustrine deposits occur along Muscatatuck River and streams entering that river and East Fork White River (59). A deposit of sand is found in the upland near the southeast corner of the county (3).

DRAINAGE FEATURES

Washington County lies within three drainage basins of the state. The northern part is about equally divided between the Muscatatuck and East Fork subdivision of the White River basin (3). The central and southern parts are in the Blue River basin. The extreme southeastern part is in the Minor Ohio basin.

Blue River rises in the county. Its drainage divide describes a wide arc in the county. The Muddy Fork Silver Creek, flowing into Clark County, has captured some of the headwater streams of Blue River. North-flowing tributaries of the Muscatatuck River have dissected the Norman Upland. The Blue River valley varies in width, being wide and nearly level in some places. In the meandering north-south portions of its course it appears to be a strike stream. Natural drainage is best developed in the Knobstone escarpment region. The escarpment face is a series of valleys and ridges. Valley cross sections are V-shaped and the divides sharp-crested. The course of South Fork Blue River appears to conform to the dip of the bedrock. Subterranean drainage exists in the limestone areas. This type drainage may or may not contribute to the run-off of the streams crossing the immediate area. Lost River rises in the county. In the drift-covered areas low-gradient intermittent streams extend for long distances into the gently sloping uplands. Drainage patterns are relatively fine-textured in the dissected sandstone-shale areas. Delaney Creek is deflected near the Muscatatuck River. Streams passing through the Crawford Upland are meandering.

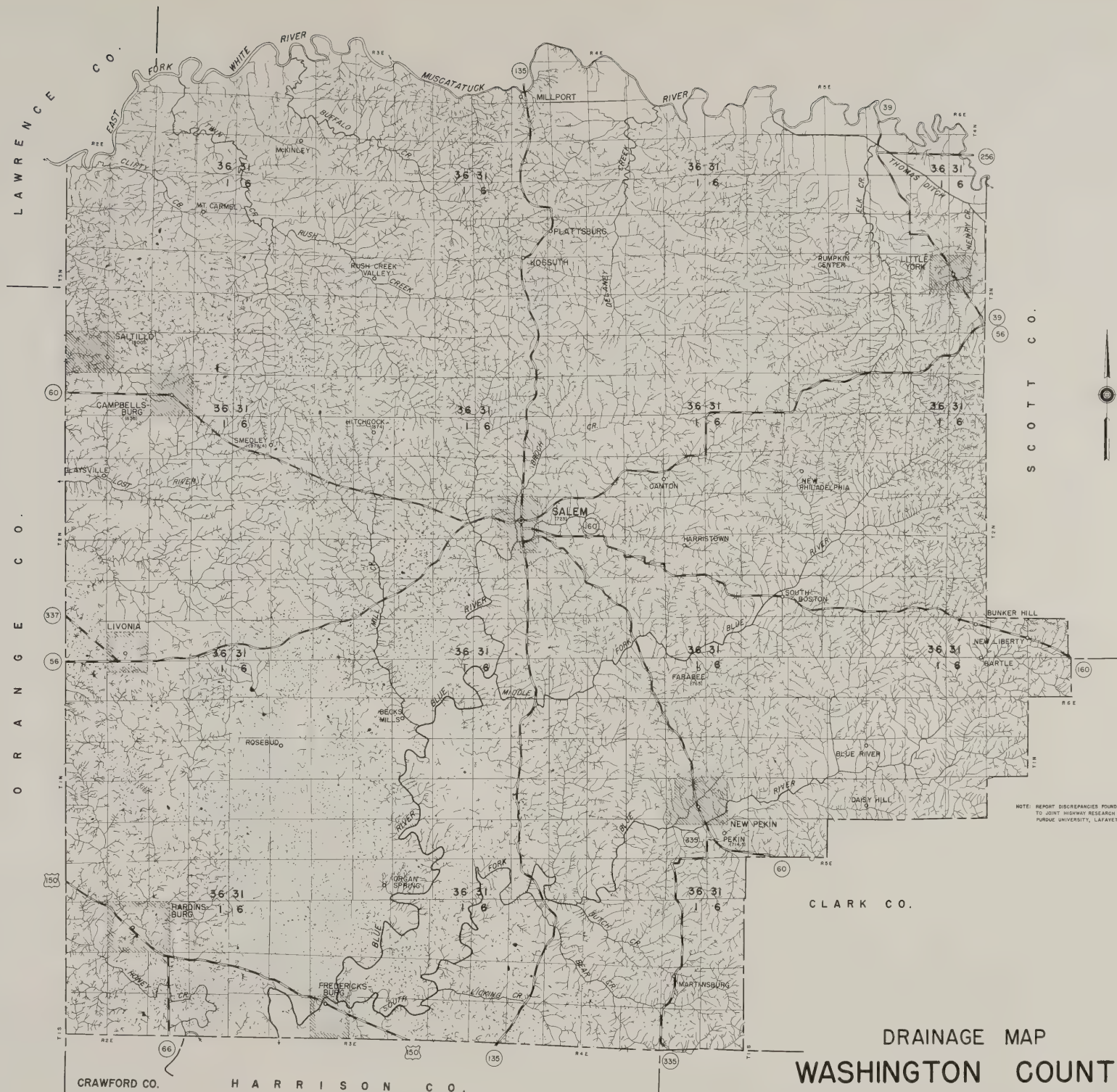
There are no natural lakes in the county. Water-filled sinkholes and other ponds of various origins have been mapped.

Ditches have been dredged in the lacustrine areas along the Muscatatuck River and elsewhere to improve sluggish drainage conditions. In the northeast corner the lowlands along the Muscatatuck River are drained by ditches.

Stream gaging stations are located on Blue River at Salem and on Brock Creek at Salem (12).

Note: The drainage map was prepared from 1938 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1952.

JACKSON CO.



NOTE: HEIGHT DISCREPANCIES FOUND ON THIS MAP
BY JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP
WASHINGTON COUNTY
INDIANA

PREPARED FROM
1938 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1952



POLYCONIC PROJECTION

WAYNE COUNTY

GENERAL NATURE OF THE COUNTY

Wayne County is in the eastern part of the state. Its area is approximately 405 square miles (1). Richmond, the county seat, is 70 miles east of Indianapolis.

Average annual precipitation is 40.89 inches at Cambridge and 38.21 inches at Richmond (2). Average annual snowfall is expected to be about 20 inches.

The south part of Wayne County (slightly less than half the county) lies within the Dearborn Upland physiographic region of the state (3). The northern part is in the Tipton Till Plain. In respect to its physiographic situation in the United States, the county is in the Till Plains section of the Central Lowland province (3).

The surface of the county is that of a glaciated plain. It is broken by the valleys of the two forks of the Whitewater River and their tributaries. Ridges of morainic systems are integral portions of the western and northern parts of the plain. Maximum local relief is about 150 feet (3). East Fork Whitewater River flows through a deep, narrow, rocky gorge at Richmond. The streams in the western part have shallow valleys. Morainic areas are undulating. Wayne County is one of the three counties in Indiana with an average altitude of over 1,000 feet (3). The highest part is in the northern portion; this is due in part to the moraine and in part to the elevation of the bedrock. The upland plain in the vicinity of Boston is very nearly level. Many interstream areas in the central part are gently undulating. Valleys are, in general, shallow in the north and fairly deep in the south. The valleys in the western half appear to be formed in the drift mantle; the valley floors are composed of valley train materials.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary deposits are both glacial and recent in age. Bedrock, in the northern, eastern, and extreme west-central parts of the county, consists of strata of Silurian age. In the remainder of the county they belong to the Ordovician age. Limestone outcrops in the bed of Whitewater River at Richmond and at several other places in the southern part of the county.

All Wayne County was glaciated (10). The surface drift is Wisconsin in age. In places the drift attains a thickness of as much as 200 feet (8). Wayne County is crossed by portions of several moraines (8). In the western part is found a section of the Shelbyville moraine. The Hartwell moraine extends into the central-southern part. What appears to be a merged portion of these two is combined with the Bloomington morainic system which covers the northern and northeastern parts of the county.

The soils have been developed mainly from glacial materials (5) (60). Those soils on the steep slopes in the southeastern part have been influenced by underlying bedrock to a certain extent. Some of the materials have been reworked by water. Upland soils belong to the Miami and Russell catenas. Fox, Homer, and Abington soils occur on the granular deposits. Alluvial soils belong to the Genesee catena. Depression areas have Cope, Clyde, and Westland soils. Only small areas of muck and peat have been mapped. Upland subsoils are moderately to slowly permeable (6). River valley subsoils are mostly very permeable.

Granular materials have been found in stream valleys and in knolls and ridges (7). Granular materials are plentiful in the county. Principal areas producing sand and gravel are located both in the east-central and west-central parts. Other areas of granular materials are in the northern part. The glacial sluiceways contain much granular material.

DRAINAGE FEATURES

Wayne County lies within the Whitewater drainage basin of the state (3). The eastern third is in the East Whitewater River subdivision and the remaining two-thirds is in the West Fork Whitewater River subdivision of the basin.

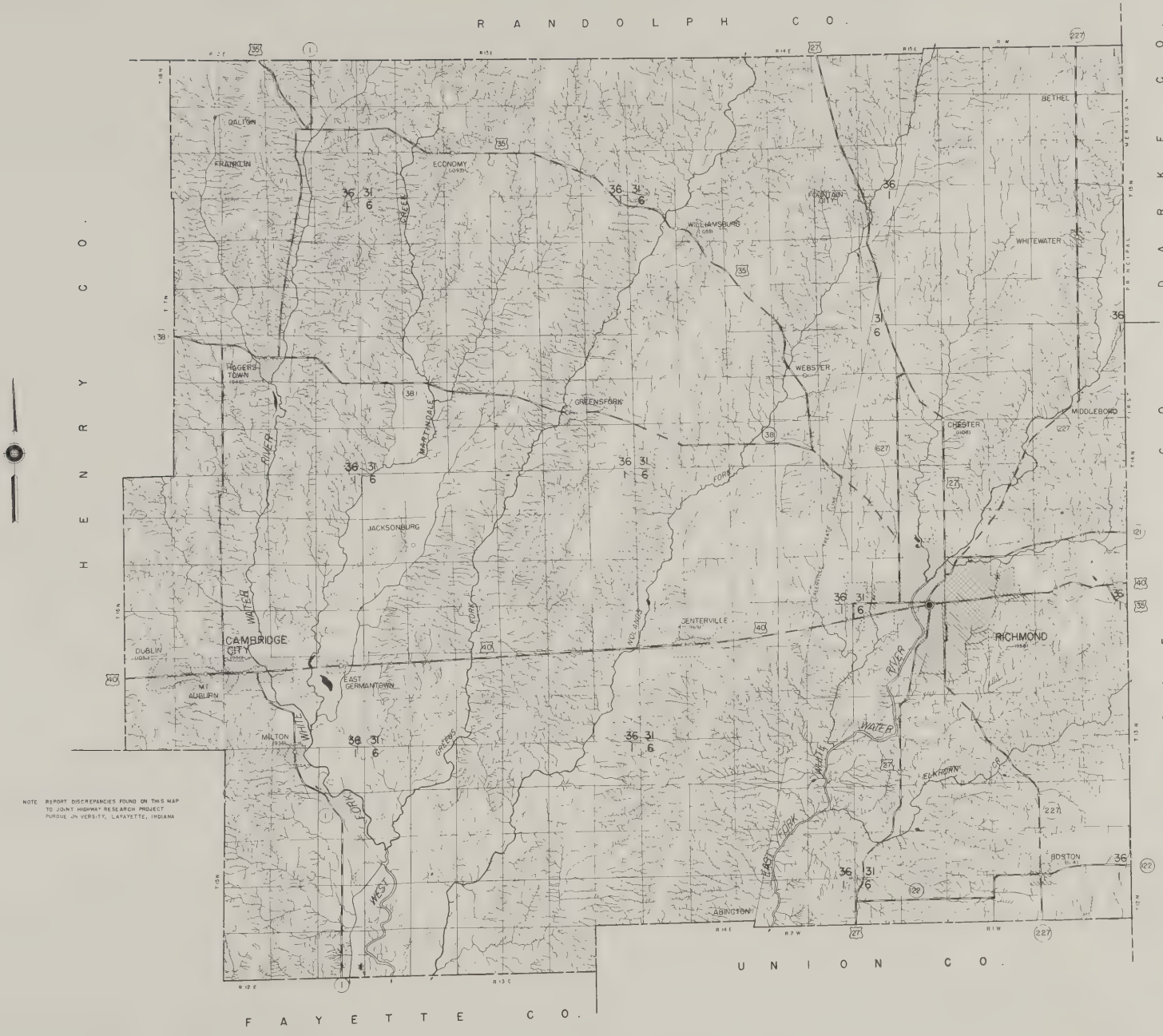
The general trend of the drainage is to the southwest. A portion of the old Whitewater Canal still exists south of Cambridge City. The streams in the southeastern part show the effects of rock control on their courses. East Fork Whitewater River has some rather definite angular bends. Elkhorn Creek has a deflected course. The valleys of the larger streams appear to have acted as glacial sluiceways. The headwater streams of the West Fork Whitewater River in the western half of the county are in broad, basin-like valleys. Drainage is better developed near the stream valleys than in the interfluves. There is a lack of developed drainage pattern in the granular valley train deposits. Valleys in the southwestern part contain several shallow basins. Watershed divides are defined by the crests of sections of moraines in the county. Control of some stream courses, some stream deflections, and increased densities of drainage patterns can be attributed, at least partially, to the presence of the moraines. Local depressions occur in various parts of the county. Tributaries of West Fork Whitewater River cross a morainic area. The direction of flow of this stream may in effect be controlled by the Laughery escarpment.

There are no large lakes in the county. Ponds of various origins are scattered throughout the several sections of the area.

Ditches have been constructed where necessary to improve sluggish drainage conditions. Streams have been dredged in some cases.

A stream gaging station is located on the East Fork Whitewater River at Richmond (12). The drainage area of East Fork Whitewater River above Richmond is about 116 square miles (12). Less than 70 square miles of Ohio drain into the Whitewater River system (12).

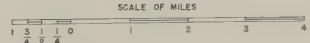
Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1949.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP WAYNE COUNTY INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1949



WELLS COUNTY

GENERAL NATURE OF THE COUNTY

Wells County is in the northeastern part of Indiana. Its area is approximately 368 square miles (1). Bluffton, the county seat, is 85 miles northeast of Indianapolis.

Mean annual precipitation is 37.72 inches at Bluffton (2). An average annual snowfall of 25 inches can be expected.

Wells County lies wholly within the Tipton Till Plain physiographic region of the state (3). In respect to its physiographic situation in the United States, it is in the Till Plains section of the Central Lowland province (3).

The surface of the county is that of a glacial plain broken by the valleys of the Wabash and Salamonie rivers and their tributaries. It is ridged by the Salamonie and Wabash moraines. Maximum local relief is about 75 feet (3). The greater part of the county is a somewhat uneven plain. The northeastern, west-central, and south-central parts are nearly level to gently undulating tracts, the differences in local elevation being very slight. Along the major streams, the land is fairly rolling. The valleys of the Wabash and Salamonie rivers are narrow and comparatively shallow. A rolling area extends north-northwest of Bluffton. A slight ridge passes through that city. Another occurs a few miles south. The southwest corner has some very rolling terrain.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock consists of strata of Silurian age. Rock outcrops occur, particularly along the Wabash River near Bluffton and Vera-Cruz. Limestone is also exposed along Rock Creek and in the eastern edge of the county (30).

All Wells County was glaciated (8). Surface drift is Wisconsin in age. The thickness of the drift varies; its depth is 200 feet or more in the southwest corner. It is probably deepest in the buried valley of a tributary to the preglacial Teays River (13). Two moraines cross the county in a general southeast-northwest direction (8). The Salamonie moraine is in the southwestern part and the Wabash moraine extends from the center of the east county line to the northwest corner. The Wabash moraine is poorly defined in places.

The soils of Wells County have been developed from materials of glacial origin, some of which have been reworked by water (5). The soils of uplands belong to the St. Clair catena. Fox soils occur on the granular terraces. Some of the depressed areas have Clyde soils. Bottom land soils belong to the Genesee catena. Many of the depressions contain soils of high organic content. Some contain muck and/or peat. In general natural permeability of the subsoils is slow to very slow (6).

Granular deposits occur along the Wabash River northwest of Bluffton (7). Gravel has been obtained near Keystone. Subsurface deposits of granular materials occur. Some gravel has been found in knolls. Areas producing sands and gravels are located in several places in the central, northwestern, and southwestern parts.

DRAINAGE FEATURES

Wells County lies within two major drainage basins of the state (3). The southwestern part of the county is in the Salamonie subdivision of the Wabash basin, the area drained by Eight Mile Creek is in the Little Wabash subdivision of the Wabash basin, and the central portion is drained directly by the Wabash River. The northeast corner is in the Maumee basin. Small areas along the eastern side drain into Ohio.

Major drainage lines extend from the southeast to the northwest. Local basins occur in all parts of the county. Filled glacial channels are drained artificially. Crests of sections of moraines define watershed divides in the county. Control of some stream courses, some stream deflections, and increased densities of drainage patterns can be attributed, at least partially, to the presence of the moraines. Only short tributaries enter the Wabash River in the central part. A singular feature is the abrupt change in course of Six Mile Creek. Eight Mile Creek, Big Creek, and Flat Creek have curving courses. The course of the Wabash River in southeastern Wells County was established apparently by the Wabash moraine. Near Bluffton, the river veers westerly from the Wabash moraine. The Salamonie River owes its location to the Salamonie moraine. Scuffle Creek crosses this moraine. Most stream valleys are narrow. Surface drainage is best developed in the uplands adjacent the major stream valleys. Flat Creek is deflected. Many local watershed divides are broad and nearly level.

There are no natural lakes in Wells County. Ponds of various origins and a few water-filled gravel pits and quarries are scattered throughout the county. The reservoir at the Wells County State Forest and Game Preserve is an artificial lake.

Ditches have been constructed to improve sluggish drainage conditions in the nearly level areas. Numerous streams have been dredged.

A stream gaging station is located on the Wabash River at Bluffton (12). The drainage area of the Wabash River above Bluffton is about 600 square miles (11).

Note: The drainage map was prepared from 1940 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1954.



DRAINAGE MAP WELLS COUNTY INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1954



POLYCONIC PROJECTION

WHITE COUNTY

GENERAL NATURE OF THE COUNTY

White County is in the north-central part of the state. Its area is approximately 497 square miles (1). Monticello, the county seat, is 75 miles northwest of Indianapolis.

Mean annual precipitation is 34.90 inches at Norway (2). An average annual snowfall of 25 inches can be expected.

The southern half of White County is in the Tipton Till Plain physiographic region of the state (3). The northern part is in the Kankakee Lacustrine section of the Northern Moraine and Lake region. In respect to its physiographic situation in the United States, the southern part of the county is in the Till Plains section of the Central Lowland province (3).

The surface of the county is that of a glaciated plain dissected by its principal streams and modified by wind and water action. It is ridged by moraines in the southern half. Maximum local relief is about 110 feet (3). The southern half is comparatively uneven. The terrain is somewhat uneven in the eastern part. The southwestern part is a gently undulating plain. Sandy areas are nearly flat. The northern part is nearly level, having some sand dunes and ridges. The Tippecanoe River valley is prominent. Morainic topography is rather rolling.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both Pleistocene and recent in age. Bedrock, in the northeastern fourth of White County, consists of strata of Silurian age. In the remainder of the county the bedrock has been mapped as Mississippian in age. Rock outcrops occur near Monon, Norway, and Wolcott. Sandstone has been quarried near Wolcott. Limestone is quarried near Monon. Shale is exposed along the Tippecanoe River near Norway. Limestone occurs in the bed of the Tippecanoe River near Monticello (30).

All White County was glaciated (3). Surface drift is Wisconsin in age. The drift varies in thickness to more than 300 feet in the southeastern corner in the buried valley of the preglacial Teays River. Morainic areas extend intermittently in a belt across the southern part of the county; this belt is an extension of the Nebo-Gilboa ridge in Benton County (9).

The soils of the county have been developed from glacial materials (5). Many of them have been reworked by wind and water. Soils of the upland areas belong to the Miami, Carrington, Parr, and Russell catenas. Sand areas have Plainfield and Newton soils. Fox soils occur on the granular deposits. Depressed areas have Clyde and Maumee soils. Alluvial soils belong to the Genesee catena. Organic soils are mucks and peat. Very permeable subsoils occur in the northern part of the county; in the central part they are mostly permeable; and in other areas they are moderately to slowly permeable (6). River valley subsoils are very permeable.

Granular deposits occur along the Tippecanoe River and in knolls and ridges in other parts of the county (7). Knolls of granular material are found in the vicinity of Chalmers. Areas producing sands and gravels are located in the southeastern and central-northern part of the county (9). The northern part of the county is covered with deposits of sand (9)(26). In places these materials have been formed into dunes and ridges. The sand ridges have an east-west trend. Sandy tracts lie east of the Tippecanoe River. A sand ridge extends southwestward from the vicinity of Monon. Deposits of peat and muck have been found beneath the sand ridges near Reynolds.

DRAINAGE FEATURES

White County lies within two major drainage basins of the state (3). Most of the county is in the Wabash basin with much of it being in the Tippecanoe subdivision. Only small areas in the northwestern part are in the Kankakee basin.

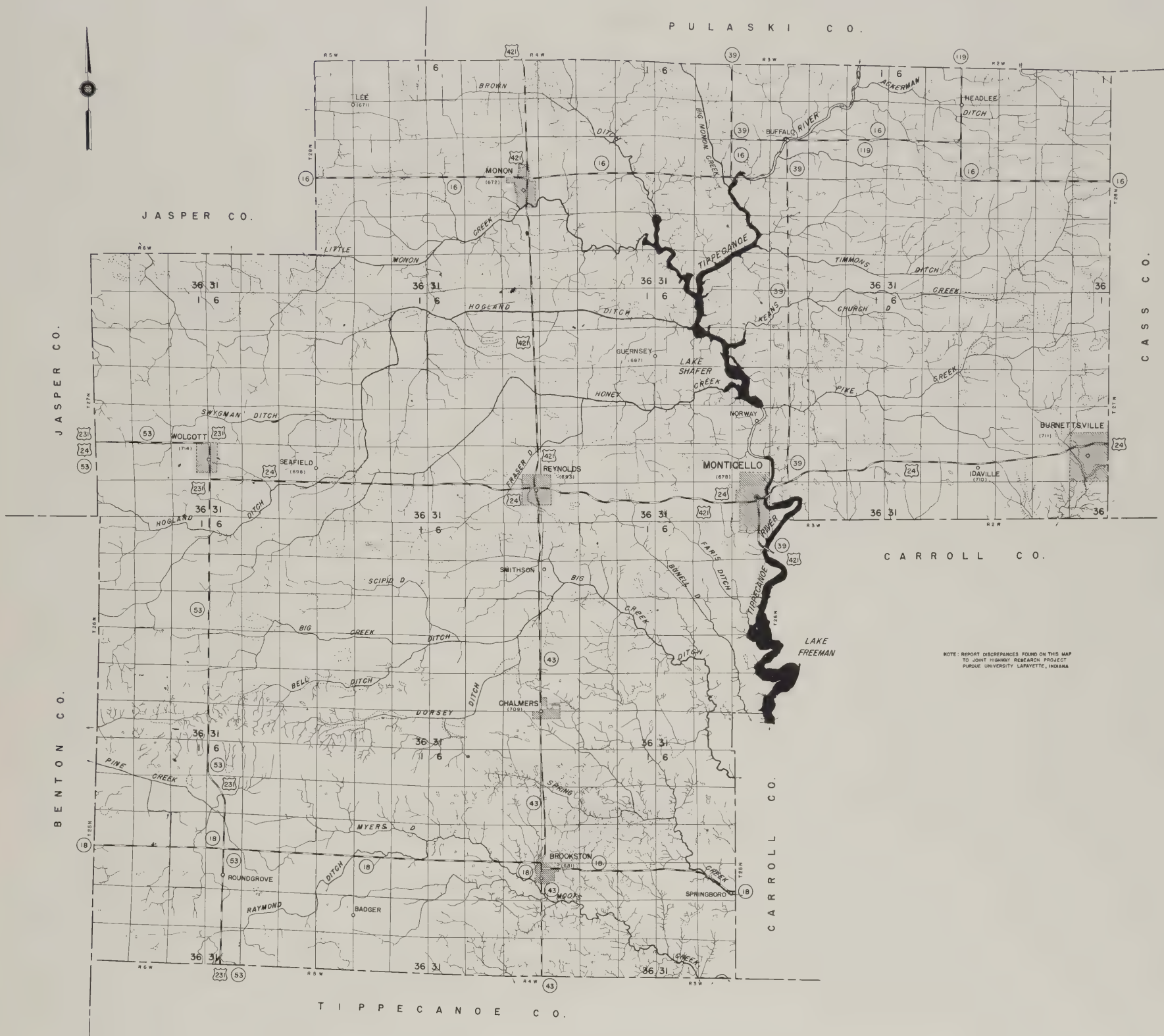
The Tippecanoe River has its highest gradient in the vicinity of Monticello. Reservoirs have been built on this river for hydro-electric power production. Tributary streams of the Tippecanoe River in the southern part have rather high gradients. Crests of sections of moraines define watershed divides in the county. Some control of stream deflections can be attributed, at least partially, to the presence of the moraines. Increased drainage pattern densities appear to be associated with topography and surface materials of the moraines. The northeasterly trend of Little Monon Creek is singular. Local basins occur in nearly all parts of the county. In the southern part the tributaries of the Tippecanoe River flow easterly. Several local watershed divides are broad and nearly level.

There are no natural lakes in the county. Lake Shafer and Lake Freeman are two artificial lakes resulting from the damming of the Tippecanoe River. Ponds of various origins are scattered over the area.

Ditches have been constructed to improve sluggish drainage conditions. Streams have been dredged.

A stream gaging station is located on the Tippecanoe River at Monticello (12). The drainage area of the Tippecanoe River above Norway is about 1,800 square miles (12).

Note: The drainage map was prepared from 1938-1939 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1954.



NOTE: REPORT DISCREPANCIES FOUND ON THIS MAP
TO JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY, LAFAYETTE, INDIANA

DRAINAGE MAP WHITE COUNTY INDIANA

PREPARED FROM
1938 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY
1954



WHITLEY COUNTY

GENERAL NATURE OF THE COUNTY

Whitley County is in the northeastern part of the state. Its area is approximately 336 square miles (1). Columbia City, the county seat, is 105 miles northeast of Indianapolis.

Mean annual precipitation is 35.81 inches at Columbia City (2). An average annual snowfall of about 30 inches can be expected.

Whitley County lies wholly within the Steuben Morainal Lake section of the Northern Moraine and Lake physiographic region of the state (3). In respect to its physiographic situation in the United States, it is in the Eastern Lake section of the Eastern Lowland province (3).

The surface of the county is that of a glaciated plain. It is broken by the valleys of the principal streams. The presence of the moraines adds an unevenness to the plain. Maximum local relief is about 80 feet (3). The morainal portions are rolling, consisting of many knobs and basins. In the western part morainic ridges are steep sided. The moraine near Columbia City has deep, irregular, elongated valleys, with narrow, sharp, winding ridges. Lakes have formed in some of the basins in other parts. Morainic features are prominent in places. Intermorainic areas are gently rolling.

Surface and near surface geologic ages represented in the county are the Quaternary period and the bedrock formations (4). Quaternary materials are both glacial and recent in origin. Bedrock, in the southern third of the county, consists of strata of Silurian age. In the remainder of the county they are of Devonian age. There are no known rock outcrops.

All Whitley County was glaciated (3). Surface drift is Wisconsin age. The drift thickness may reach 350 feet or more in the southwest corner. The county is crossed by portions of three morainic systems (10). The Packerton moraine covers the northwest corner. The Mississinewa moraine extends from the southwest corner in a northeasterly direction to near the center of the north county line. The Salamonie moraine extends from near the center of the south county line to the northeast corner; in the southern part it is a low, gently rolling ridge.

The soils of the county have been derived from glacial materials, many of which have been reworked by water (5). Upland soils have been mapped as belonging to the Miami and St. Clair catenas. The areas bordering Eel River from the center of the county to its western edge have Fox, Westland, and Oshtemo soils. Some Colona soils are located in the west-central part of the county. Alluvial soils are of the Genesee catena. Some depressed areas contain Clyde and Westland soils. Mucks and/or peat are other organic soils. Most of the basins contain soils of high organic content. In the northwestern half of the county the subsoils are permeable while in the southeastern half slowly to very slowly permeable subsoils exist (6). River valley subsoils are very permeable.

Granular material deposits occur in the Eel River valley and in knolls and ridges in several parts of the county (7)(13). Subsurface deposits of granular materials exist at various places. Areas that produce sand and gravel are located mostly in the central part of the county.

DRAINAGE FEATURES

Whitley County lies entirely within the Wabash drainage basin of the state (3). The northwestern part is in the Tippecanoe subdivision; the southeastern corner is in the Little Wabash subdivision; the central part, bordering Eel River, is in the Eel subdivision, and a small area in the south-central part of the county is drained by minor tributaries of the Wabash River proper.

Natural drainage is perhaps best developed along the major stream valleys. Terraces exist along Eel River. Deland Ditch and other drainageways in the northwestern part are the headwater streams of the Tippecanoe River. Crests of sections of moraines define watershed divides in the county. Some control of stream courses and some stream deflections can be attributed, at least partially, to the presence of the moraines. Drainage patterns are haphazard; their densities can be associated with topography and surface materials of the moraines. Eel River crosses morainic areas. It traverses the entire county. Two watershed divides cross the county, one across the southeast part and the other across the northwest part. Indian Creek is a southeasterly flowing stream and Deland Ditch drains in a northwesterly direction. The course of Spring Creek appears to be controlled by the Packerton moraine. Blue River flows between the Mississinewa and Salamonie moraines. Indian Creek and Sugar Creek flow in opposite directions. Mud Creek flows between areas of diverse topography. The divide between the Tippecanoe and Eel rivers is in a morainic area.

Whitley County contains several natural lakes in the northern part. Some of them are more than a mile long. Ponds of various origins are scattered over the area. The lakes have a variety of size, depth and outline of shore. Basins and lakes interrupt the continuity of the streams, especially in the northern part of the county. The lakes tend to stabilize the flow of their outlet streams. Streams wander from lake to lake.

Gaging stations are located on Blue, Goose, Loon, Old, Round, Shriner, Troy, Cedar, and Wilson lakes (12).

Many of the streams have been dredged to improve natural drainage. Ditches have been constructed where necessary to drain basins and swampy tracts.

Note: The drainage map was prepared from 1951 USDA aerial photographs in the Joint Highway Research Project at Purdue University in 1956.

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